GERAGHTY & MILLER, INC.
Environmental Services

Ground Water *Engineering* *Hydrocarbon* *Remediation* *Education*

November 30, 1992

VIA FEDERAL EXPRESS

Mr. David Novak
Community Relations Coordinator
Office of Public Affairs (PS-19J)
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

Re: Himco Superfund Site, Elkhart, Indiana

Subject: Public Comment Submittal

Dear Mr. Novak:

On behalf of American Home Products Corp.; CTS Corporation; Elkhart General Hospital; ESI Meats, Inc.; Excel Industries, Inc.; and Truth Publishing Company (collectively referred to hereafter as the Respondents), Geraghty & Miller, Inc. is pleased to submit the enclosed public comment document for the above-referenced site. We request that the enclosed comment document be placed in the Administrative Record file since it has been submitted pursuant to the request for public comment.

A review of the data found within the administrative record has revealed that there is no apparent significant threat to either human health or the environment posed by the Himco Superfund Site. Based on a reevaluation of the alternatives using the information provided within the administrative record, it is clear that the No Action Alternative complies with USEPA and IDEM guidance and regulations, is protective of public health and the environment, meets ARARs for the site, and is consistent with the requirements of the National Oil and Hazardous Substances Contingency Plan (NCP).

Geraghty & Miller and the Respondents have also reviewed a draft public comment document being prepared by Miles, Inc., and are in agreement with the conclusions presented therein regarding the appropriateness of the No Action remedy. The Respondents encourage the USEPA to review any comments received by Miles, Inc., as the draft comment document raised many substantive comments.

The USEPA Proposed Alternative as set forth in the Proposed Plan is excessive and is inconsistent with the goals of the NCP, particularly with respect to cost

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effectiveness as set forth in Section 300.430 (f)(1)(ii)(D) of the NCP which states "Each remedial action selected shall be cost effective, provided that it first satisfies the threshold criteria [of overall protection of human health and the environment and compliance with ARARs].... A remedy shall be cost effective if its costs are proportional to its overall effectiveness." Based on a review of the administrative record and the subsequent reevaluation of alternatives, it appears as though the No Action alternative is the most appropriate remedy for this site.

If you have any questions or comments regarding the enclosed public comment document, please do not hesitate to call either Jack Kratzmeyer or Gary Kruger at (312) 263-6703.

Sincerely,
GERAGHTY & MILLER, INC.

Gary W. Kruger
Gary W. Kruger
Project Engineer

Jack L. Kratzmeyer
Jack L. Kratzmeyer
Principal Engineer/Project Manager

enclosure

cc: Ms. Mary Elaine Gustafson (HSRL-6J), USEPA

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cc: Ms. Mary Elaine Gustafson (HSRL-6J), USEPA

H8/CI22201.HIM/NOVAK1.LTR

PUBLIC COMMENTS RELATIVE TO THE PROPOSED PLAN AND SUPPORTING DOCUMENTATION FOR THE HIMCO DUMP SUPERFUND SITE ELKHART, INDIANA

November 30, 1992

Geraghty & Miller, Inc. is submitting this comment report to American Home Products Corp.; CTS Corporation; Elkhart General Hospital; ESI Meats, Inc.; Excel Industries, Inc.; and Truth Publishing Company for work performed in conjunction with the Himco Dump Superfund Site in Elkhart, Indiana. If you have any questions or comments concerning this comment report, please contact one of the individuals listed below.

Respectfully Submitted,

GERAGHTY & MILLER, INC.

Gary W. Kruger
Project Engineer

Jack L. Kratzmeyer
Principal Engineer/Project Manager

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1.0 INTRODUCTION

The following comments are submitted by Geraghty & Miller, Inc. (Geraghty & Miller), on behalf of American Home Products Corp.; CTS Corporation; Elkhart General Hospital; ESI Meats, Inc.; Excel Industries, Inc.; and Truth Publishing Company (collectively referred to as the Respondents) in response to the request for public comment dated September 1992 (USEPA 1992a) as presented during the public meeting held on October 6, 1992 regarding the Himco Dump Superfund Site.

The Respondents request that this Public Comment Document be placed in the Administrative Record file since it has been submitted pursuant to the request for public comment consistent with the requirements of the NCP, particularly, the preamble discussion relative to the receipt of comments during the comment period that contain significant information (55 Fed. Reg. 8799-8803, March 8, 1990). The USEPA is expected to provide complete and specific responses to all comments contained in this presentation as detailed in the "Response To Comments" attendant to the selection of an appropriate remedy, as required by Sections 300.810 and 300.815 of the National Contingency Plan (NCP).

In some instances in this Comment Report, Geraghty & Miller has requested information and clarification from the USEPA. In the event the USEPA chooses not to fulfill these requests, Geraghty & Miller anticipates that, consistent with the intentions and requirements of SARA and the NCP, the USEPA will provide a detailed response which specifies the reasons it has chosen not to fulfill any specific request or respond to any specific comment.

While every attempt has been made to clearly state and reference each comment, the Respondents and Geraghty & Miller welcome the opportunity to respond to any questions the USEPA may have relative to this submittal. Presented below are the specific comments regarding the Proposed Plan and supporting documentation, followed by a summary of the comments and a list of references used for this report.

2.0 SPECIFIC COMMENTS

The following comments pertain to specific information within the Administrative Record file for the Himco Dump Superfund Site. All comments are numbered and reference the document(s) reviewed and the general subject to which the comment is directed.

(1) Overall Condition of Off-Site Ground Water

Based on a review of the materials within the administrative record, Geraghty & Miller concurs with the USEPA conclusion that RI sampling has revealed "very little or no groundwater contamination outside of the boundary of the landfill" and that "ground water has not been impacted to a level of health and environmental concern by the site contaminants" (Donohue 1992c; USEPA 1992). The information used to support this conclusion included the following:

- The site-related risks associated with both current and future ground-water use scenarios are within acceptable risk ranges (Donohue 1992c; LifeSystems 1992a);
- Virtually all of the calculated risk for ground water is attributable to background conditions or conservative risk estimates associated with non-detected constituents (Donohue 1992c);
- Dissolved concentrations of inorganic, volatile organic, and semivolatile organic constituents do not exceed MCLs in the off-site ground water (Donohue 1992b); and,
- The release of leachate from the landfill to the aquifer appears to be decreasing over time (Donohue 1992b) (see Comment (2) below).

The condition of the off-site ground water immediately downgradient of the landfill reflects the net effect of the landfill upon the aquifer under the No Action condition since the fill was opened in 1960. In the 16-year period following landfill closure, with no additional capping or cap maintenance, the landfill has not significantly impacted the off-site ground water, and the release of constituents from the leachate to the aquifer is apparently decreasing. The USEPA is requested to carefully consider the landfill's obvious lack of impact to off-site ground water in making a remedial action decision. This lack of ground-water impact under the No Action scenario drastically reduces the need for (and realistic benefit from) any additional capping or a leachate collection system, and suggests that the No Action alternative would be an appropriate remedial action for this site.

(2) Decreasing Release of Leachate

The USEPA Remedial Investigation (RI) (Donohue 1992b) notes that the overall bromide (plume-indicator) concentration detected during the RI sampling rounds were significantly lower than those detected approximately 10 years earlier by the United States Geological Survey (USGS). Based on these sampling events alone, it is noted later in the RI that the decreasing levels of bromide in the ground water "suggests that there may have been a larger release of leachate in the past" (i.e., the release of leachate is decreasing over time). This conclusion is further supported by new information not currently found in the administrative record. The USGS has completed a 10-year study of ground-water quality in northwestern Elkhart, Indiana from 1980 to 1989 (USGS 1991). This analysis found that dissolved bromide concentrations within the ground water in the vicinity of the landfill peaked in July/August, 1982. Appendix A contains the three figures from this USGS report that summarize bromide data collected for the years 1980, 1982, and 1988. These findings support the USEPA conclusion that the release of leachate is decreasing over time.

The generally decreasing bromide concentration over the past decade under the current (no action) condition of the landfill must be considered in making informed remedial action decisions on this site. The USEPA is asked to consider this new information in making their final decision, as it supports the USEPA conclusion of decreasing release of leachate over time under the No Action scenario, which provides a solid argument against the need to implement any additional capping system on this site.

(3) Overall Risk Posed by the Site

In summarizing the results of the Risk Assessment performed for the site (LifeSystems 1992a), the USEPA Feasibility Study (FS) concludes that off-site risks are within acceptable risk ranges for both the current and hypothetical future use scenarios on the site. The FS also states that "there appears to be no cause for concern for any current uses of the site. All carcinogenic risk estimates are below 1E-4....and no Hazard Indices [indicating non-carcinogenic risks] exceed 1" (Donohue 1992c).

In addition, there are no longer any current users of the aquifer within the vicinity of the site with the exception of one residence (Donohue 1992c) whose water has been demonstrated to pass drinking water standards (USEPA 1992d). City water is available in the vicinity of the site should unlikely residential construction occur in the future; the availability of city water makes the completion and utilization of landfill leachate drinking water wells an implausible option. It should also be noted that institutional controls (e.g., well use restrictions) will provide the sole method of prevention of ground water or leachate use on the site regardless of the remedy selected, and that the installation of any additional capping materials would not prevent the future hypothetical use scenario for ground water or leachate beneath the site as presented in the baseline risk assessement.

The only apparently significant risk scenario associated with the site involves the unlikely hypothetical future residential or commercial development of the landfill property and the associated consumption of leachate for drinking water at the site. Current USEPA guidance on this subject requires that a logical, reasonable argument for selection of any alternate land use be presented in the risk assessment to support the selection of any future use scenario, and that this support should include a "qualitative statement of the likelihood of the future land use occurring" (USEPA 1989). The USEPA Risk Assessment correctly asserts, however, that this scenario is "unlikely" and "may not be technically and/or financially reasonable," and that if development is limited or does not occur, future activities on the site "would be similar to current recreational activities" (LifeSystems 1992a).

The summary of the calculated human health risks presented within the FS should be accompanied by a sufficient explanation of the significance of these calculated risks in making risk management decisions. Recent USEPA guidance on the role of the baseline risk assessment in Superfund remedy selection decisions (USEPA, 1991) recommends that 10^{-4} (one in ten thousand) be used as an action level for most sites. This guidance states that:

> *Generally, where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 10^{-4} lifetime excess cancer risk end of the risk range, action under CERCLA is generally warranted at the site. For sites where the cumulative site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, action generally is not warranted, but may be warranted if a chemical specific standard that defines acceptable risk is violated or unless there are noncarcinogenic effects or an adverse environmental impact that warrants action.*

Later in this same guidance it is stated that:

Furthermore, the upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risks. Therefore, in certain cases EPA may consider risk estimates slightly greater than 1×10^{-4} to be protective.

Excluding the unlikely and unreasonable hypothetical usage scenarios of residential/commercial construction on the landfill site, the carcinogenic risks reported in the risk assessment at the Himco site are all less than 10^{-4}, no chemical specific standards for the materials found on the site are reported to be violated, noncarcinogenic risks associated with the site are not significant, and no significant adverse environmental impacts are identified. The area surrounding the landfill is currently industrial/agricultural, and will likely remain so in the future. Furthermore, the summary of the uncertainties in the USEPA Risk Assessment notes that, due to the nature of the intentionally conservative assumptions made throughout the risk assessment process, "the risks estimated for this site should be considered approximate and are more likely to be higher [than the actual risks] than lower" (LifeSystems 1992a).

In agreement with current USEPA guidance, therefore, it is reasonable to conclude that current conditions at the site are protective of human health (carcinogenic and non-carcinogenic risks) and do not warrant a remedial action, even when using the highly conservative USEPA baseline risk assessment values. In addition, the assumption of future residential land use cannot be justified since the probability that the site will support residential uses in the future is exceedingly small. The USEPA is asked to provide justification for the future land use determination, or to reasonably assume that the land use will not change in the future.

(4) <u>The Effect of Leachate on Ground Water</u>

Throughout the Administrative Record for the site, it is well documented that although leachate does exist beneath the landfill, the leachate is not currently significantly impacting the ground-water quality off the landfill site (Donohue 1992b; Donohue 1992c; USEPA 1992b). It is for this reason that the FS in reference to the single barrier solid waste cap with leachate collection states that "in view of the current no-impact groundwater condition, the risk-based added level of protection to groundwater provided by the leachate collection system at this site is theoretically null" (Donohue 1992c). Geraghty & Miller concurs with the above assessment that since the current (No Action) scenario results in no significant impact to ground water under current actual leachate generation rates with no cover improvements, *any* efforts to minimize leachate will result in no significant reduction in overall risk posed by the site. The USEPA is therefore asked to explain the risk-based rationale behind their recommendation of the implementation of a "solid waste" cap to reduce infiltration.

(5) <u>RODs at Similar Sites</u>

Records of Decision (RODs) for similar sites that were signed in the past five years were reviewed for consistency with the USEPA Proposed Remedy on the Himco site. Brief summaries of the RODs are presented below:

<u>Old City Landfill, IN (March 1992)</u>

Old City Landfill was a municipal/industrial landfill that operated from 1938 to the mid to late 1960's. The landfill was closed with the application of two to three feet of dredged river sediment. The human health exposure characterization at the site related to consumption of ground water was limited to exposure to a hypothetical well *downgradient* of the site, and no significant current or future risks were noted. A modified "No Action" remedy was implemented at this site. A copy of the Old City Landfill ROD is included as Appendix B.

<u>Peterson Sand and Gravel, IL (September 1988)</u>

The RI and EA indicated some contamination, including PAHs and PCBs in the surface soil, but the risk assessment revealed no significant risks. Much like the Himco site, buried drums and paint waste were removed from the fill prior to the proposed plan. The remedy chosen was "no further action."

<u>Big River Bend, KS (June 1988)</u>

Previous actions on the site included drum removal (2000 drums of mainly paint-related wastes). Following the drum removal, there was no longer a current threat to human health or the environment. The remedy chosen was "no further action."

These sites demonstrate that the remedies selected for other landfills with similar levels of current and potential human health and environmental risks have been modified no action to no further action. The USEPA is requested to present valid arguments as to why the Himco site is substantially different from these above-referenced sites so as to justify a substantially different remedy.

(6) ARARs Compliance for No Action Alternative

The FS for the site (Donohue 1992c) states that the No Action alternative "does not satisfy or comply with current federal or state ARARs" on page 4-6, and yet in the Comparison of Final Alternatives Table (Table 4-5 of the same FS report), it is simply stated that the No Action alternative is "[n]ot *expected* to comply with ARARs" (emphasis added). The USEPA is asked to reexamine the ARARs compliance of the No Action alternative, as no evidence in the administrative record files reviewed suggested that the site currently fails to satisfy (or is expected to not satisfy) ARARs.

(7) Proposed Capping System Comments

(A) Relative Efficiencies of Existing and Proposed Caps

The Technical Memorandum A4 provided in the Himco FS (Donohue 1992c) has been reviewed by Geraghty & Miller, Inc. for consistency with the State of Indiana solid waste regulations, federal ARARs, and acceptable engineering practice. The design presented in the technical memorandum was simulated using the Hydrologic Evaluation for Landfill Performance (HELP) model, Version 2.0.

A preliminary review of Technical Memorandum A4 suggests that some assumptions used by USEPA contractors for parameters in the HELP model are inconsistent with accepted practice. These parameters include the following:

- The use of compacted vegetative layers;
- The use of higher runoff curve numbers than would normally be expected;
- The use of poor vegetative cover conditions; and
- The use of an inappropriate soil barrier texture number.

The assumed use of compacted vegetative layers reduces the soil properties such as porosity, field capacity, wilting point, and saturated hydraulic conductivity which affect the growth and proliferation of cover grass that limits soil erosion from the landfill. The porosity is intrinsically related to the field capacity, wilting point, and saturated hydraulic conductivity. By compacting the vegetative layer, the pore space is reduced, hence a reduction in field capacity, wilting point, and saturated hydraulic conductivity. The result is more runoff and weathering of the surface soil. From a practical viewpoint, compaction of the vegetative layer is not beneficial to the seeding of grass which would normally fall into micro-crevices in the soil and gain an anchoring system by root growth.

The assumption of a higher runoff curve number (CN = 95) indicated in the technical memorandum is not typical for grassed slopes (CN = 39 to 85). A curve number of 95 is comparable to a semi-impermeable surface. The highest possible curve number is 98 for asphalt or concrete pavement. Default CN values calculated by the HELP model are usually accurate for the slopes less than about 22.0 percent. The minimum slope in accordance with the State of Indiana solid waste regulations is 4.0 percent. It is assumed that the minimum slope has been used in the calculation of CN values and therefore, a CN value of 95 is not realistic for this site, and a lower default value should be used.

The assumption of poor vegetative conditions (25-50 percent grass cover) from a practical viewpoint is not appropriate for maintenance purposes to minimize erosion. State ARARs indicate that erosion values should not exceed 5 tons per acre per year. The calculation of erosion using the universal soil equation was not evaluated in this review. However, the conditions of poor ground cover is likely to cause major soil erosion problems. It should be noted that the current landfill cover was approved by the Indiana State Board of Health under a consent agreement, and is reported to include a healthy vegetative cover. This cap has apparently functioned effectively since its installation in preventing any significant off-site impact to any media. The disturbance of this successful cover system through construction activities on the landfill (e.g., during placement of another cap) could cause excessive erosion to the current cover system resulting in significant short-term risks.

The unrealistically low assumed texture number used in the clay cap design (No. 15) resulted in more predicted infiltration through the layer than commonly used default barrier layer texture numbers (No. 16 and 17). This in turn results in a number that disproportionately favors the composite barrier over the single layer cap design.

In summary, several assumptions that were used in running the HELP model were inappropriate for this site, and resulted in skewing the results to show a greater difference between the multilayer cap and the single layer or No Action scenarios. In addition, it should also be noted that the extremely low levels of infiltration estimated for the composite cap are suspect, and are subject to a large margin of error. The HELP model is intended to be used as a tool to determine relative amounts of infiltration between differing cap designs. The model is not intended to be used as a tool to determine absolute leachate generation rates for which more sophisticated models are needed.

(B) Unsupported Proposal of Active Gas Collection and Treatment

Other than the fact that the waste mass gas has been found to contain very low quantities of volatile organic compounds and that a survey of basements in the vicinity of the landfill revealed no detected landfill gases (Donohue 1992b), the quantity and quality of the landfill gas on the Himco site has not been accurately determined, and the USEPA plans to refine this information as part of their pre-design investigations (Donohue 1992c). The USEPA has nonetheless proposed the use of an active gas collection and treatment system for use with all proposed capping systems. However, the assumption of the necessity of *any* landfill gas collection or treatment system for use on the Himco site is undemonstrated as detailed below.

The vast majority of waste within the Himco landfill will not generate significant quantities of landfill gas. In general, domestic/municipal/household refuse has the potential of more gas production than does demolition debris or industrial wastes. The waste mix at the site has been described by the USEPA as "calcium sulfate..., demolition and construction debris, industrial and hospital wastes, and some household garbage" (USEPA 1992b). The USGS reported that "[o]nly small volumes of domestic wastes were disposed of at the site" (USGS 1991). Indeed, an estimated 2/3 of the waste deposited within the landfill consisted of Calcium Sulfate (Donohue 1992a; Donohue 1992b; Donohue 1992c), which is not biodegradable and therefore would not generate landfill gas (Donohue 1992c, Appendix A).

The FS estimates of landfill gas generation are based on unrealistic assumptions that serve to inflate the predicted hypothetical gas production rate at the landfill. No effort has been made in the documentation presented in the FS to estimate the total amount of gas that could be expected to be produced at the Himco site based on actual site conditions and disposal history. Citing literature published by the California Air Resources Board (CARB), Donohue estimated a current methane production rate at the Himco landfill of 7.26 X 10^6 standard cubic feet per year (scf/yr). This estimate is based on an assumed constant annual yield of methane gas per unit weight of buried refuse and does not recognize the fact that there is a finite quantity of gas that can be produced from any landfill. The calculated number presented in the FS assumes that 32 years after initial waste placement and 16 years after final closure the Himco landfill would hypothetically continue to generate methane at a constant and undiminished rate. This is contrary to the recognized phased process of decomposition that is known to occur at landfills, and the finite gas generating life of buried organic wastes.

As a check on the initial calculated value of 7.26 X 10^6 scf/yr Donohue estimated hypothetical gas production rates at the site using a range of values (1 scf/yr to 7 scf/yr) for the total expected yield of gas per pound of refuse. Although this approach enables a hypothetical ultimate yield of landfill gas to be calculated, a *constant* generation rate over time was assumed to estimate projected annual gas production rates. Generating lives of both 70 and 100 years were used to project future hypothetical gas production rates at the site. The rationale for assuming these timeframes is not explained, and the USEPA is asked to provide the site-specific basis for this assumption. An annual landfill gas generation rate of 0.15 scf/lb/yr is frequently used to estimate gas production in landfills. An estimate of the generating life of the refuse can be determined from the total gas yield used (e.g., 1 scf/lb divided by 0.15 scf/lb/yr = 6.6 years). For the range of ultimate gas yields assumed in the FS (1 scf/lb to 7 scf/lb) the corresponding range for the gas generating life of the landfill would be approximately 6 to 46 years. The interpretation of any estimate of continued landfill gas generation on the Himco site needs to account for site-specific factors including the fact that the waste was deposited in a relatively thin layer (approximately 15 feet thick) and that the landfill has been closed for over 16 years.

In summary, the need for a landfill gas control system at the Himco site has not been demonstrated. If any part of the final remedy for the site potentially utilizes a landfill gas control system, USEPA is requested to perform a pre-design landfill gas investigation that considers both the potential ultimate yield of gas based on site-specific conditions and the actual generation rate over time to determine the necessity of any landfill gas control technology on the site in accordance with current ARARs.

(C) Cost Estimate of Capping Systems

A cursory review of both the single and multilayer caps revealed that the costs for the two capping systems (particularly the topsoil, clay, sand, and borrow costs) appear to be underestimated. As a check to the USEPA cost estimate, Geraghty & Miller contacted an alternate local contractor who had not quoted on the work during the FS process. The local contractor's costs were significantly higher than the FS estimates for all soil materials quoted (see Appendix C). It is suspected that the costs used in the FS report were inaccurate, and may have been based on materials prices as delivered (not installed or compacted). The resultant cost for topsoil therefore increased from \$9.29/CY to \$19.00/CY; sand costs increased from \$7.29/CY to \$16.00/CY; clay costs increased from \$7.65/CY to \$18.00/CY; and common borrow increased from \$7.57/CY to \$13.00/CY. Holding all other costs the same, the capital costs for the multilayer cap used in the USEPA proposed remedy increases from \$6,130,000 to \$11,445,000, which singularly increases the entire remedy cost from \$11,821,000 to \$19,156,000. Although these updated costs may represent the upper range of material costs, the additional \$7,000,000+ is extremely significant as it is over and above the upper limit of the cost sensitivity analysis conducted within the FS, exceeds the +50%/-30% intended accuracy of the USEPA cost estimate, and as such, suggests that the FS may present an inaccurate basis to evaluate the alternatives. The USEPA is asked to reevaluate the alternatives and their respective cost effectiveness based upon this new information.

(D) Overall Effectiveness and Cost Effectiveness of Proposed Cap

Clean-Up Objectives for the site as expressed in the FS for the site (Donohue 1992a) are to:

- *Prevent direct contact with landfill contents and contaminated soils in the construction debris area.*
- *Control groundwater usage in the vicinity of the site;*
- *Minimize contaminant leaching to groundwater to ensure that groundwater remains unimpacted by the site contaminants.*
- *Maintain the long-term cap integrity by incorporating a gas collection system and drainage control measures into the landfill body.*

The specifics within these objectives appear to have been developed following the selection of the USEPA preferred remedy, as they are specific to the actions incorporated into the USEPA preferred remedy. The overall purpose of these objectives is obviously to prevent future exposure to waste material/waste constituents. However, this objective is being accomplished currently (and has been accomplished for the past 16 years) through the No Action alternative. The selection of the stringent multilayer cap over the area (along with the other aspects of the preferred remedy) do not significantly contribute to the reduction of risk to human health and the environment simply because the USEPA has established that no such significant risk is occurring at the present time, and it is unlikely and unreasonable to assume that the risks will reach significant levels in the future (see Comment (3)).

Based on the reevaluation of the alternatives using all of the information provided within the administrative record, it is evident that the No Action alternative complies with all USEPA and IDEM guidance and regulations, is protective of public health and the environment, and meets ARARs for the site.

The USEPA Proposed Alternative as set forth in the Proposed Plan is excessive and fails to comply with the NCP, particularly with respect to cost effectiveness as set forth in Section 300.430 (f)(1)(ii)(D) of the NCP which states "Each remedial action selected shall be cost effective, provided that it first satisfies the threshold criteria [of overall protection of human health and the environment and compliance with ARARs].... A remedy shall be cost effective if its costs are proportional to its overall effectiveness." At a cost of approximately $12,000,000 to $19,000,000, the preferred remedy accomplishes no significant reduction in risks using both current and reasonable maximum future use scenarios, since neither of these scenarios under No Action ($0) results in a significant level of site-related risk.

3.0 SUMMARY AND CONCLUSIONS

The USEPA Proposed Plan for the Himco Superfund Site (along with other supporting documentation within the Administrative Record file) was reviewed for technical soundness, consistency with current USEPA guidance, and consistency with past decisions on other similar superfund sites. The following conclusions can be drawn regarding the site, as supported by the information contained within the administrative record:

- There are no current significant human health threats posed by the site-related constituents either on or off the landfill site;
- With the exception of the unreasonable (and institutionally preventable) residential/commercial development of the landfill proper, all future risks to on- and off-site receptors posed by site-related constituents are within acceptable risk ranges;
- There are no significant environmental risks posed by the site;
- Under the current (No Action) conditions, the leachate beneath the landfill has had little or no impact to off-site ground water;
- Under the current (No Action) conditions, the release of constituents to the on-site ground water appears to be decreasing over time; and,
- There are no exceedences of ARARs due to site-related constituents on or off the site.

Based on the conclusions presented within the administrative record and following USEPA guidance on the role of the baseline risk assessment in Superfund remedy selection decisions (USEPA, 1991), the current and future risk posed at the Himco Dump Superfund Site falls into an acceptable range where remedial action is generally not warranted. The USEPA proposal of a stringent multilayer cap with an active gas collection system on this site is far in excess of the requirements for an Indiana solid waste cap; is unsupported by the documentation within the Administrative Record; is counter to USEPA guidance on Superfund remedy selection (USEPA 1991); is overestimated in relative benefit to No Action; is underestimated in cost impact; and is inconsistent with the NCP, particularly with respect to cost effectiveness as set forth in Section 300.430 (f)(1)(ii)(D) (USEPA 1990a). There is insufficient justification for the proposal of the USEPA-recommended remedy that, at a low-end estimate cost of $11,800,000, fails to provide any proportional reduction in human health or environmental risk. The Respondents therefore request that the USEPA and IDEM carefully reevaluate the alternatives and select the No Action alternative for the Himco Superfund Site.

4.0 REFERENCES

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Donohue 1992c. Final Feasibility Study Report, Himco Dump Superfund Site Remedial Investigation/Feasibility Study, Elkhart, Indiana, September, 1992.

Life Systems 1992a. Baseline Risk Assessment - Human Health Evaluation, RI/FS Support for the Himco Dump Site, July 29, 1992.

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Mittelhauser 1992. Immediate Removal Action Summary Report for County Road 10 Landfill, Elkhart, Indiana, August 27, 1992.

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USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. EPA/540/8-89/002. Washington, D.C. December, 1989.

USEPA 1990a. National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, 40 CFR Part 300, March 8, 1990.

USEPA 1990b. Request for a Removal Action at Residences Adjacent to the Himco Dump site, Elkhart, Elkhart County, Indiana, August 29, 1990.

USEPA 1990c. Request for a Removal Action at Residences Adjacent to the Himco Dump site, Elkhart, Elkhart County, Indiana. Memorandum from Verneta Simon to David Ullrich, November 6, 1990.

8.0 REFERENCES (Cont'd)

USEPA 1991. OSWER Directive 9355.0-30. Subject: Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. From: Don R. Clay, Assistant Administrator. Office of Solid Waste and Emergency Response. Washington, D.C. April 22, 1991.

USEPA 1992a. U.S. EPA Proposed Plan for the Himco Dump Site, Elkhart, Indiana.

USEPA 1992b. EPA Recommends Cleanup Plan for Himco Dump, Elkhart, Indiana, September, 1992.

USEPA 1992c. U.S. EPA Administrative Order by Consent in the matter of Himco Dump (Drum Removal Effort), June 1, 1992.

USEPA 1992d. Letter from Paul Steadman, OSC, to Mike Stoner regarding Private Well Sampling Results, July 16, 1992.

USEPA. National Priorities List, Himco, Inc., Dump, Elkhart, Indiana.

USGS 1981. Hydrologic and Chemical Evaluation of the Ground-Water Resources of Northwest Elkart County, Indiana, October, 1981.

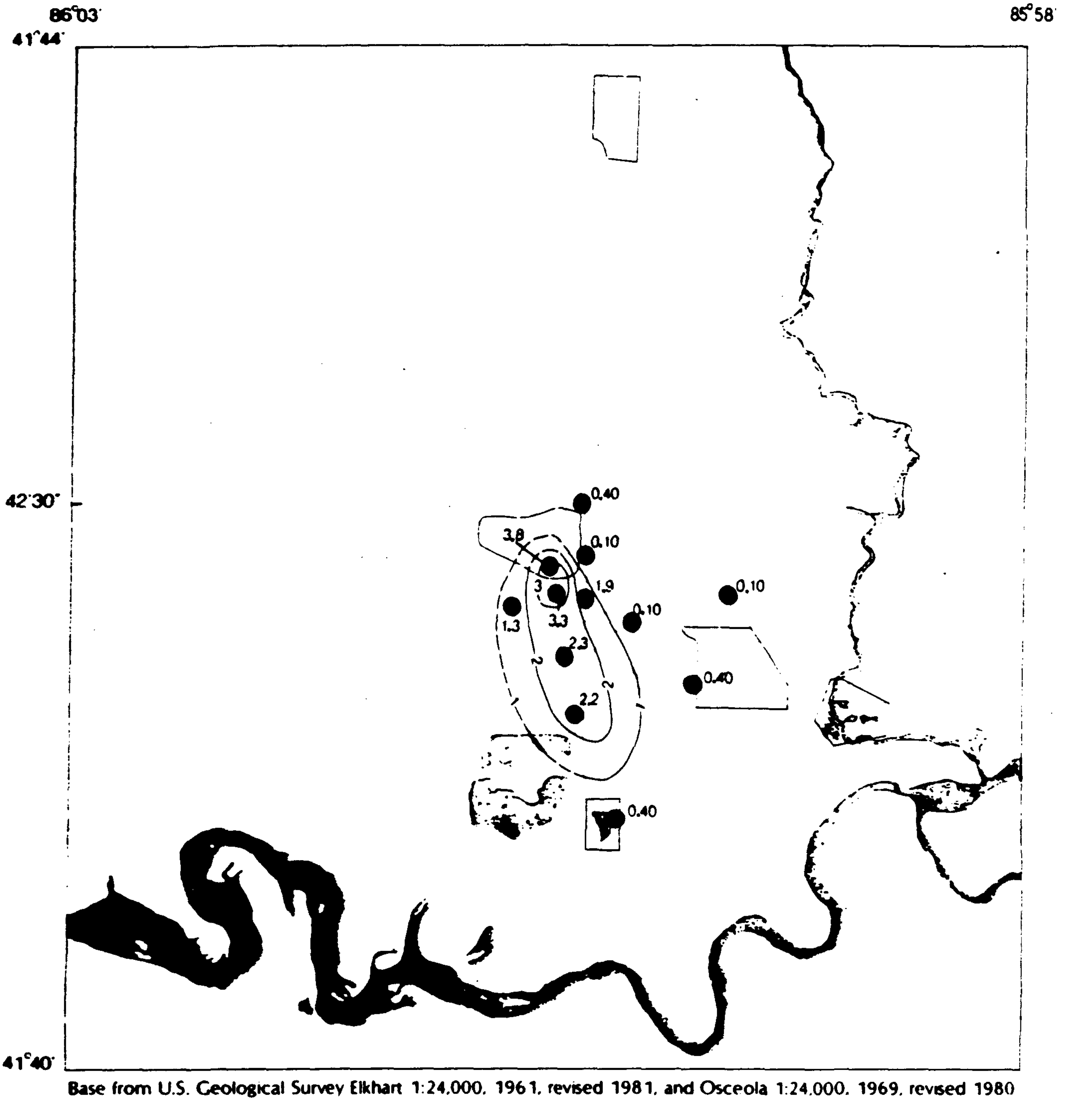
USGS 1991. Ground-Water Levels, Flow, and Quality in Northwestern Elkhart County, Indiana, 1980-89.

Weston 1990. Letter to Mr. Duane Heaton, USEPA Deputy Project Officer, June 28, 1990.

APPENDIX A

SUMMARY OF HISTORICAL BROMIDE DATA

(Source: U.S. Geological Survey)



EXPLANATION

——2— — — LINE OF EQUAL CONCENTRATION OF DISSOLVED BROMIDE--Dashed where approximately located. Interval 1 milligram per liter

● 2.3 MONITORING WELL--Number is dissolved-bromide concentration, in milligrams per liter

Figure 9.– Areal distribution of maximum concentrations of dissolved bromide in ground water near the landfill, November and December 1980.

Base from U.S. Geological Survey Elkhart 1:24,000, 1961, revised 1981, and Osceola 1:24,000, 1969, revised 1980

EXPLANATION

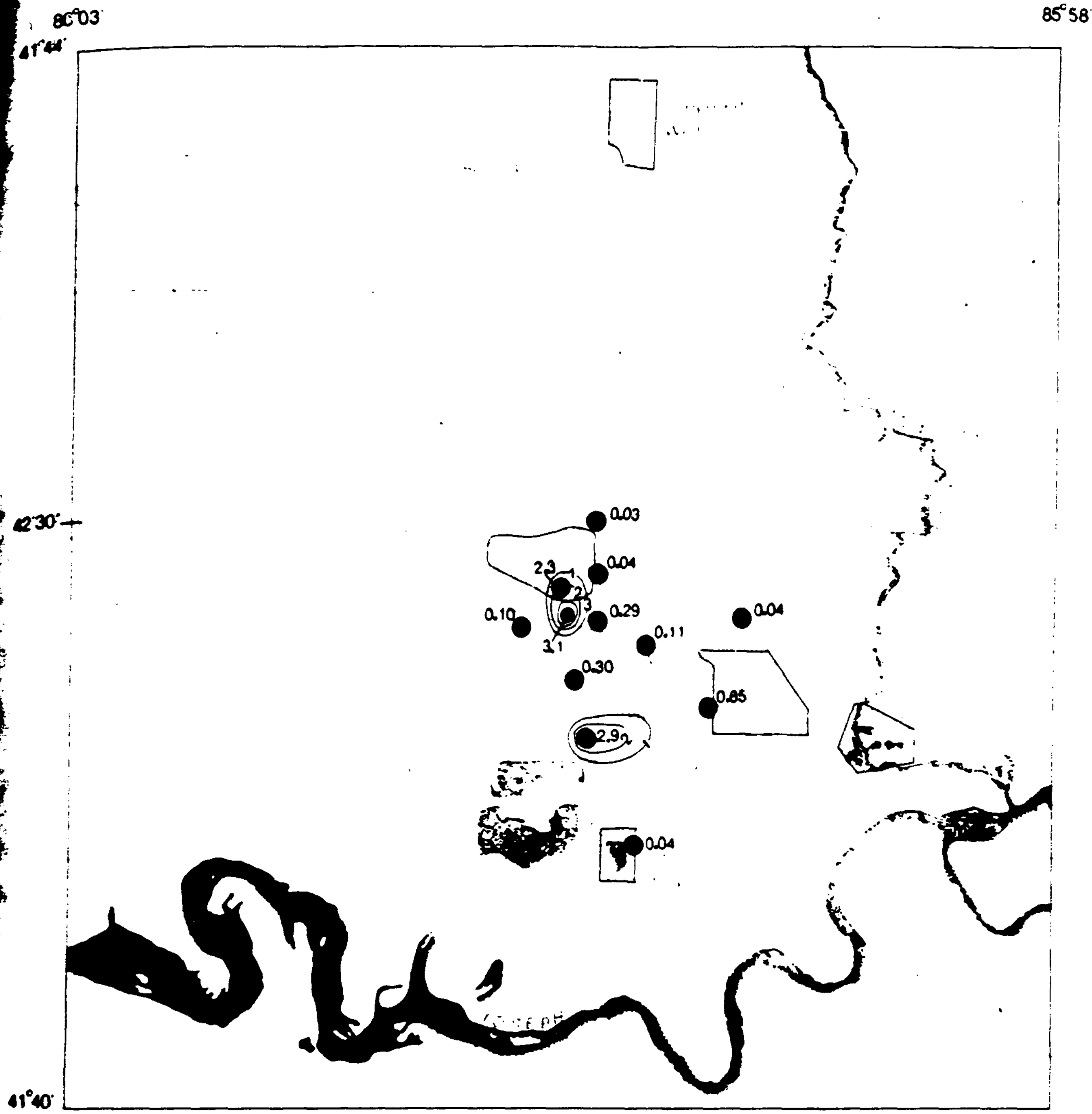
—— 2 — — LINE OF EQUAL CONCENTRATION OF DISSOLVED BROMIDE--Dashed where approximately located. Interval 1 milligram per liter

● 2.3 MONITORING WELL--Number is dissolved-bromide concentration, in milligrams per liter

0 1 2 MILES

0 1 2 KILOMETERS

Figure 10.-Areal distribution of maximum concentrations of dissolved bromide in ground water near the landfill, July and August 1982.



Base from U.S. Geological Survey Elkhart 1:24,000, 1961, revised 1981, and Osceola 1:24,000, 1969, revised 1980

EXPLANATION

—— 2 — — LINE OF EQUAL CONCENTRATION OF DISSOLVED BROMIDE--Dashed where approximately located. Interval 1 milligram per liter

● 2.3 MONITORING WELL--Number is dissolved-bromide concentration, in milligrams per liter

0 1 2 MILES

0 1 2 KILOMETERS

Figure 11.--Areal distribution of maximum concentrations of dissolved bromide in ground water near the landfill, August 1988.

APPENDIX B

OLD CITY LANDFILL ROD

DECLARATION

RECORD OF DECISION
SELECTED REMEDIAL ALTERNATIVE

SITE NAME AND LOCATION

Old City Landfill (OCL)
Columbus, Indiana

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Old City Landfill located in Columbus, Indiana. The decision has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and in accordance with the National Oil and Hazardous Substance Contingency Plan (NCP). This decision is based on the Administrative Record for this site. The attached index identifies the items that comprise the Administrative Record, upon which the selection of the remedial action is based.

The State of Indiana concurs with the selected remedy. The letter of concurrence is attached to the Record of Decision (ROD) package.

DESCRIPTION OF THE SELECTED REMEDY

The results of the Remedial Investigation (RI) show that the Old City Landfill, in its present condition, is within acceptable health-based and environmental quality-based guidelines. Based upon the fact that current conditions at the site do not pose an unacceptable risk, the selected remedy for this site is "No Action" (modified). In order to ensure continued protection of human health and the environment, a minimum of two (2) additional groundwater monitoring wells shall be installed at the site and groundwater monitoring shall continue on a periodic basis for a minimum of five years. At the end of this initial five year period, U.S. EPA will conduct a review to evaluate the protectiveness of the selected remedy.

The Indiana Department of Transportation and the City of Columbus have announced their desire to construct a roadway across a portion of the site, extending State Route 46 into Columbus. Although the Feasibility Study and Technical Supplement to the Feasibility Study suggest that construction of this roadway should not pose any unacceptable risks, it is impossible to fully predict future site conditions. The selected remedy is based upon current site conditions. Construction of a road on the landfill could change these conditions. For example, more leachate could be produced from compression of soils and waste material, further contaminating the ground water. This possibility was indicated in both the Feasibility Study and the Technical Supplement. Therefore, if the Indiana Department of Transportation and the City of Columbus decide to construct the proposed roadway over any portion of the landfill, the U.S. EPA will require implemention of Alternative 2A at the site. The components of this alternative are:

* Installation of a fence with appropriate warning signs around the landfill.

* Implementation of a landfill cover maintenance program, including a provision for periodic leachate seep inspections.

* Development of a Groundwater Recovery System Implementation Plan (including analytical modeling and preliminary design).

* Installation of additional groundwater monitoring wells to augment the existing well network. A minimum of two (2) additional wells are needed downgradient of the landfill in order to monitor flow towards the quarry.

* Implementation of a groundwater monitoring program, allowing for sampling at appropriate intervals, with more frequent sampling events during and after roadway construction.

* Institutional controls will be sought to reduce exposure to site contaminants by legally restricting access to the site. Deed restrictions on land and water use on the landfill will be sought from the landfill owner.

These measures are necessary to ensure continued protection to human health and the environment, both during and after construction of the proposed roadway.

STATE CONCURRENCE

The State of Indiana concurs with the selected remedy. The letter of concurrence is attached to this Record of Decision as Attachment 2.

ECLARATION

he Selected Remedy and Contingent Remedy are protective of human ealth and the environment and attain Federal and State equirements that are legally applicable or relevant and ppropriate to this site. The statutory preferences for cost-effectiveness, permanent solutions and alternative treatment echnologies are not applicable to the "No Action" (modified) alternative. In order to ensure continued protection of human health and the environment, a five-year review will apply to this action.

3/31/92
Date

Valdas V. Adamkus
Valdas V. Adamkus
Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

OLD CITY LANDFILL
LOCATED IN COLUMBUS, INDIANA

MARCH, 1992

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

OLD CITY LANDFILL

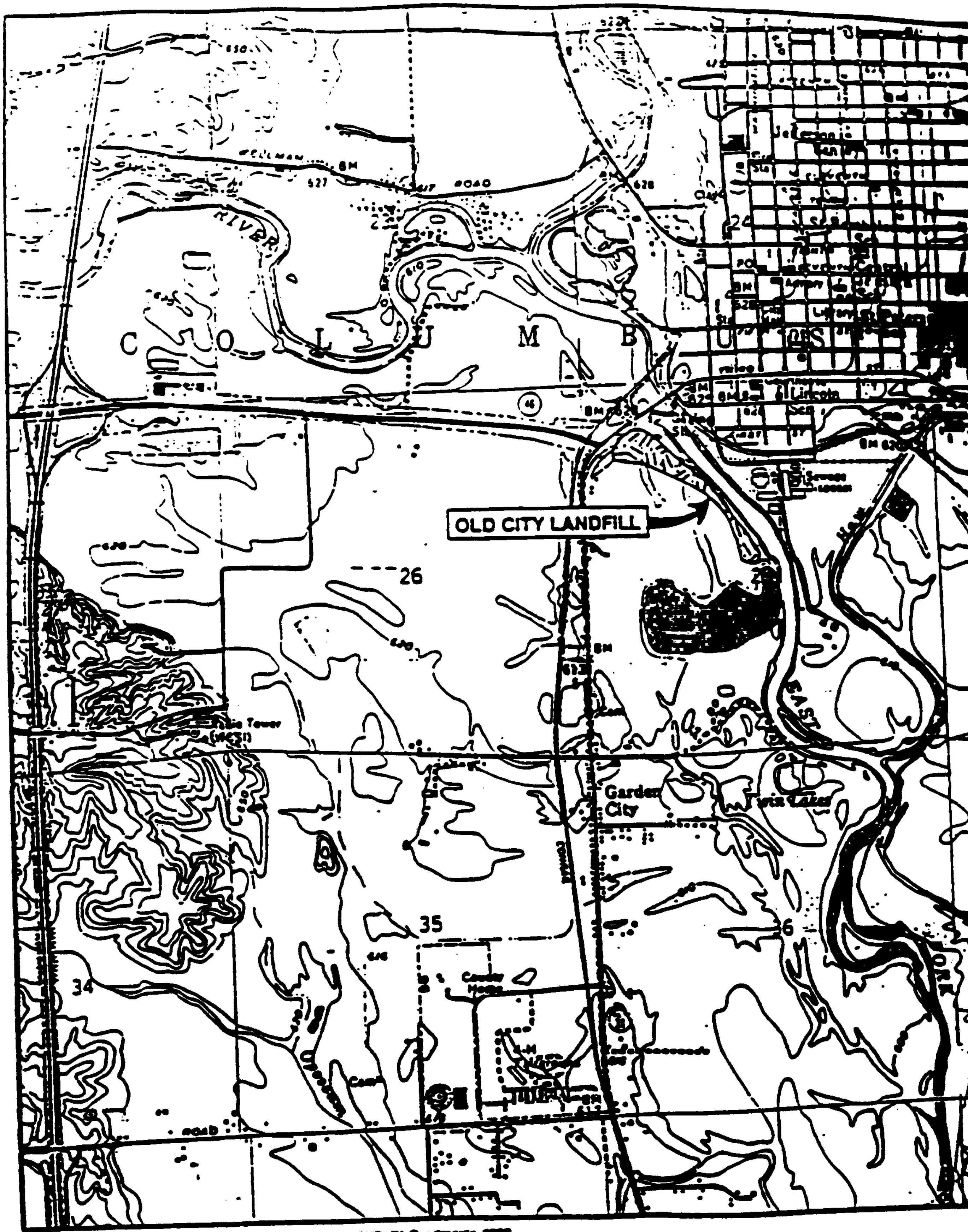
I. SITE LOCATION AND DESCRIPTION

The Old City Landfill (OCL) is located approximately 1/4 mile southwest of the City of Columbus in Section 25, Township 9 north, Range 5 east in Bartholomew County, Indiana (Figure 1). The OCL is bounded by farmland and State Route 11 to the west, the 3rd Street Bridge to the north, the East Fork of the White River to the east, and a gravel quarry pond to the south. The area between the OCL and the East Fork of the White River is a floodplain and it's vegetation generally consists of grass/small shrubs and moderate tree cover. Figure 2 shows the site area in detail.

The portion of the site containing waste material parallels the river and covers approximately 19 acres. The landfill cover material is composed of a mixture of brown to black silty sand and clay which was dredged from the East Fork of the White River. The landfill cover material is generally 2 to 3 feet in thickness across the site, however 4 to 5 feet of the cover material is present near the center of the site. The depth of the landfill material averages approximately 17 feet over the area of the landfill, and the total volume of the fill material within the landfill is estimated to be 500,000 cubic yards. Land surface elevations range from approximately 625 feet above mean sea level (msl) at the top of the fill area to 600 feet above msl at the river. The landfill surface supports a full vegetative cover of native grasses and weeds that is maintained by the present property owner.

The East Fork of the White River flows southward along the northwest and east border of the landfill. Surface runoff from the area encompassing the landfill drains into the East Fork of the White River or the cultivated fields to the west. An inactive gravel quarry, covering an area of approximately 35 to 40 acres, is located near the southeast corner of the OCL. This flooded quarry is hydrologically connected to the river through a relatively short, narrow open channel.

The OCL site is located in the 100-year flood plain of the East Fork of the White River. The 100-year flood elevation level at the site varies from approximately 618 feet near the southern extent of the landfill to 621 feet near the northern extent of the landfill. The surface of the landfill cover varies from an elevation of approximately 612 feet near the edges of the landfill to approximately 625 feet along the northeastern crest of the landfill. Thus, a portion of the surficial soil that overlies the waste material becomes submerged during a 100-year flood occurrence.



SOURCE: USGS 7.5 Minute Topographic Map COLUMBUS, IN Quadrangle [illegible]

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FIGURE 1

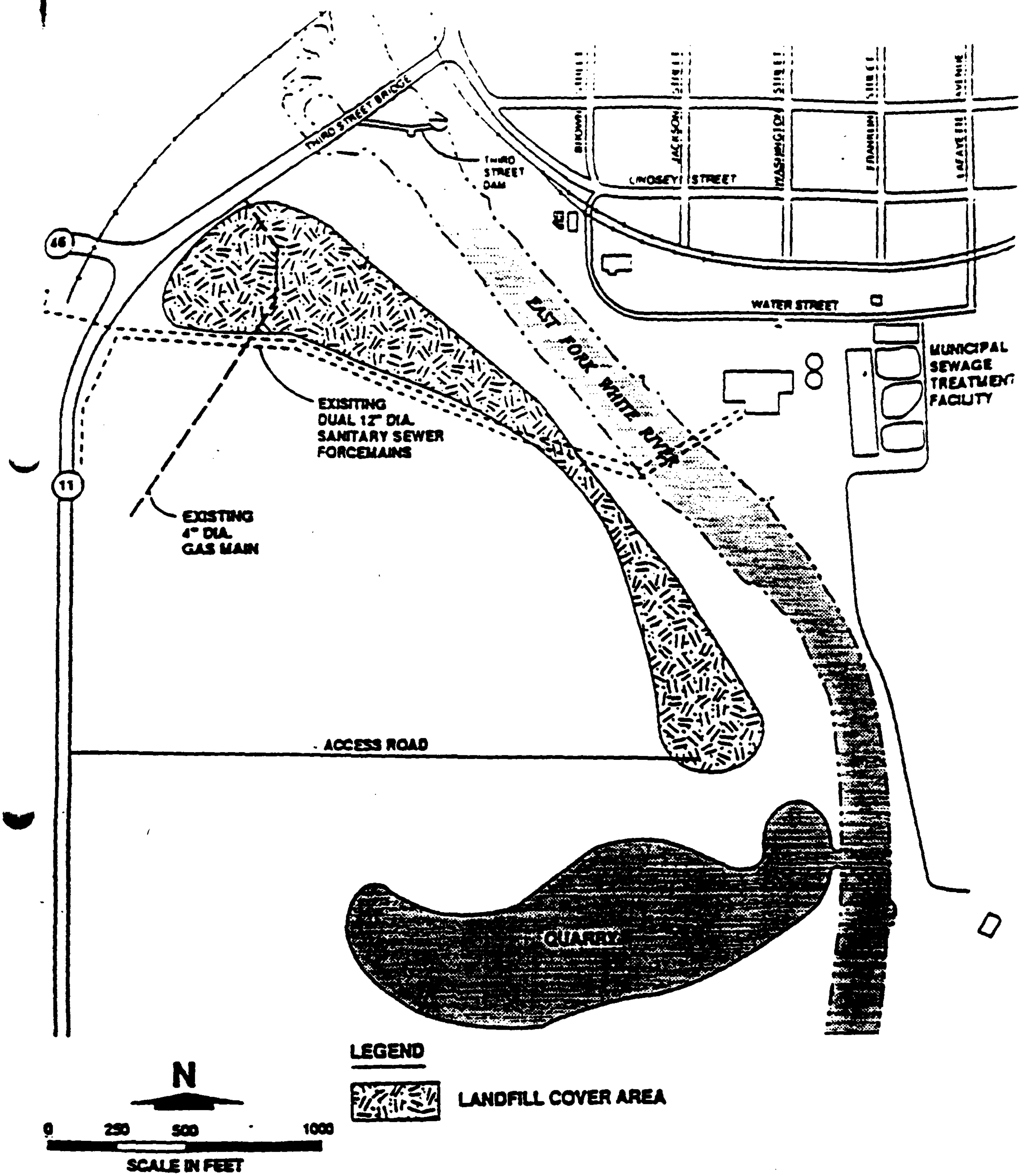

FIGURE 2
SITE CONFIGURATION MAP
OLD CITY LANDFILL
COLUMBUS, INDIANA

The OCL is underlain by a complex heterogeneous deposit of unconsolidated recent and Pleistocene age materials. The uppermost natural deposit of unconsolidated material at the site consists of coarse sand and gravel. Underlying the sand and gravel deposit is an intermittent thin sandy clay and gravel zone (glacial till) approximately 2 to 3 feet thick. The thin till zone is underlain by a very coarse sand and gravel deposit which is approximately 18 feet in thickness, and is continuous across the site. At a depth of approximately 30 to 35 feet below land surface (bls), silts and clays containing organic material become prominent. Underlying this silt and clay zone is a firm deposit of silt and clay mixed with pebbles (glacial till). This till unit extends to the shale bedrock surface, which is continuous across the site.

Groundwater beneath the site exists within a shallow aquifer which consists of the unconsolidated glacial material described above. The predominant direction of groundwater flow at the site is generally parallel to the flow of the East Fork of the White River. The shale unit underlying the unconsolidated deposits acts as an aquitard, effectively separating the upper unconfined aquifer from deeper consolidated permeable water bearing zones. The primary municipal well field for the City of Columbus is located approximately 1.5 miles to the southwest of the site. The population within a three mile radius of the site is estimated approximately 33,000 people. The distance from the site to the nearest private water supply is approximately 750 feet west (upgradient) from the northwest corner of the site.

Current land use in the immediate vicinity of the OCL is variable. The northwest section of the OCL property is used as a target practice shooting range. The southeast portion of the property is currently leased to a concrete mixing operation. However, neither the shooting range nor the concrete mixing operation are located on the landfill. The City of Columbus publicly owned treatment works (POTW) is located directly across the river. Dividing the landfill at its approximate midpoint are two 12 inch diameter, asbestos cement, sanitary sewer lines that extend across the river to the POTW. The two sanitary sewer lines are currently in use and operate as force mains. The lines are owned and maintained by the Columbus City Utilities and are located within or below the waste material. A currently active, four inch diameter steel gas main, owned and operated by Indiana Gas, also underlies the landfill near its northwestern end.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Site History

The OCL operated as a municipal landfill from about 1938 to the mid to late 1960's. Material deposited in the landfill was mainly municipal and household wastes, although waste from industrial sources was also reportedly disposed of in the landfill. No records of site operations were kept. Public dumping was not permitted; however, the site was not secured and limited dumping by unauthorized parties may have occurred. The waste material dumped at the OCL was placed directly on the ground surface. The ground surface was not lined prior to the initiation of dumping activities nor was excavation accomplished to create disposal pits. Open burning of the waste material occurred regularly. The waste material was not consistently contained under daily cover and, thus, was frequently exposed to the elements.

The disposal area was also subjected to annual spring flooding, which likely caused the waste material to become periodically submerged. Eventually, the landfill began to function as a berm between the floodplain and the farmland located west of the landfill. After the waste material reached a maximum height of approximately 20 feet, operation of the landfill ceased. The landfill was closed by placing dredged river sediment, primarily silty sand and clay, over the entire landfill. This material is generally 2 to 3 feet in thickness across the landfill and presently supports a full vegetative cover.

B. Enforcement

In August 1981, the United States Environmental Protection Agency (U.S. EPA) received a "Notification of Hazardous Waste Site" pursuant to Section 103(c) of CERCLA from Cummins Engine Company in Columbus Indiana. Waste materials generated that were reportedly disposed of at the OCL include; solvents, acids, lubricants, cutting fluids, and the metals that were extracted by the solvents.

In March, 1985, the OCL was ranked by the U.S. EPA, using the Hazard Ranking System (HRS). The results of the HRS scoring indicated the existence of a risk of actual or potential release of hazardous substances. Such a release presents a current or potential threat to public health, welfare or the environment. The HRS score of 45.31 exceeded U.S. EPAs 28.5 minimum score for inclusion on the National Priorities List (NPL). On June 10, 1986, the OCL was placed on the NPL.

Special Notice Letters, informing 12 potentially responsible parties (PRPs) (including the site's owner, operator, and waste generators) of their potential CERCLA liability for the OCL site, were sent in July 1986. The U.S. EPA and the Indiana Department of Environmental Management (IDEM) entered into an Administrative Order on November 5, 1987 with three PRPs; Cummins Engine Company, Inc., Arvin Industries, Inc., and the City of Columbus. Pursuant to this Administrative Order, the PRPs agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the OCL under the direct guidance of the U.S. EPA and IDEM. The PRPs hired Geraghty & Miller, Inc., a private contractor, (G&M) to conduct the RI/FS.

In May, 1990, the PRPs performing the RI/FS informed U.S. EPA that the Indiana Department of Transportation (INDOT) and the City of Columbus wished to construct a roadway across the landfill. The PRPs requested that the Feasibility Study be prepared in a manner that addressed this possibility. This request was granted, and a separate document, entitled "Technical Supplement to the Feasibility Study" evaluated the potential environmental impacts from construction of a roadway at the site.

C. Site Investigation

A Remedial Investigation (RI) was conducted at the OCL site from October 1988 through January 1990. The RI pursued the following objectives: (1) to assess the direction and rate of groundwater flow in the vicinity of the landfill; (2) to characterize the horizontal and vertical extent of any affected groundwater; and (3) to assess the impact of the waste material deposited in the landfill on soil, groundwater, surface water and river sediments in the vicinity of the site. Work consisted of the following activities, installation of groundwater monitoring wells and piezometers at and around OCL; surficial and subsurface soil sampling; surface water and sediment sampling from the adjacent East Fork of the White River; landfill waste sampling; and leachate seep inspections. The RI Report, with a Risk Assessment (RA) included, was completed in July 1990. The RI Report, as well as the RI Work Plan and Quality Assurance Project Plan, are part of the Administrative Record. The Remedial Investigation included the following major work components:

Surficial Soil: A total of nineteen surface soil and QA/QC samples were collected from the existing landfill cover during the RI. Background samples were collected at four locations away from the landfill. All of the surficial soil samples were analyzed for the U.S. EPA Target Compound List (TCL) parameters.

Subsurface Soil: A total of nine subsurface samples were collected for U.S. EPA TCL analysis from six soil borings located adjacent to and outside the landfill area.

Groundwater: Two rounds of groundwater samples were collected from the 13 monitoring wells and submitted for chemical analysis. The monitoring well network consisted of seven existing wells that had been installed as part of a previous investigation by a PRP in 1985, as well as six new monitoring wells installed by G&M as part of the Remedial Investigation. Twenty-three groundwater samples were submitted for analysis during the initial round of sampling, and twenty-two samples were taken in the second round with the same distribution as the first sampling round, with the exception of one less trip blank.

Measurement of groundwater elevations were taken from the monitoring wells and piezometers in order to determine groundwater flow direction.

Surface Water: Three surface water samples were collected from the East Fork of the White River to evaluate the river water quality upstream, adjacent to, and downstream of the OCL. Surface water samples were analyzed for U.S. EPA TCL parameters.

Sediments: Three river sediment samples were collected to assess the quality of the river sediments upstream, adjacent to, and downstream of the OCL. These samples were analyzed for U.S. EPA TCL parameters.

Landfill Waste: A total of eleven landfill waste samples were collected from soil borings completed in the landfill waste area. These samples were analyzed for U.S. EPA TCL parameters.

Leachate Seep Inspections: An inspection of the landfill area for leachate seeps was conducted during groundwater collection activities for each round of groundwater sampling. No evidence of active or inactive seeps were visible; therefore, no samples were collected for analysis.

A Feasibility Study Report was submitted in draft form by the PRPs to the U.S. EPA. Following review and comment by by the U.S. EPA and IDEM, the report was finalized in May 1991. The Technical Supplement to the FS was also submitted, summarizing results from a preload testing program which studied the effect of roadway weight upon the landfill material. The Technical Supplement provided geotechnical data, groundwater monitoring data, and evaluated the environmental feasibility of placing a roadway across the landfill. The Technical Supplement was finalized in November 1991.

III. COMMUNITY RELATIONS

The FS Report and the Proposed Plan were made available for public comment from January 23, 1992 through February 21, 1992. A public meeting was held during this comment period on January 30, 1992 to inform local residents of the Superfund process and about the work conducted under the RI. The U.S. EPA has responded to all significant comments received during the public comment period pursuant to Sections 113(k) (2) (B) (i - v) and 117 of CERCLA. U.S. EPA's responses to these comments is included in the Responsiveness Summary, which is attached to this ROD.

An information repository has been established at the Bartholomew County Public Library, 536 Fifth Street, Columbus, Indiana. Pursuant to Section 113 (k) (1) of CERCLA, which requires that the Administrative Record be available to the public at or near the facility at issue, the Administrative Record File is available to the public at this information repository.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

The scope of this response action is to provide a final remedy that addresses the actual or potential contamination caused by waste disposed at the OCL.

Based upon the findings of the RI, the current site risks (discussed below), and the Administrative Record, EPA has concluded that the OCL currently poses no immediate or long-term risks to human health and the environment. It is important to note, however, that this conclusion is based on current site conditions with the assumption that these conditions will not change. In addition, the selected remedy, "No Action" (modified), includes groundwater monitoring and a five year review of site conditions.

V. SUMMARY OF CURRENT SITE CONDITIONS AND SITE RISKS

The RI/FS Reports have adequately described the current conditions of the OCL site. A summary of the conclusions of the RI Report and the RA is as follows:

Surficial Soil

Evaluation of the analyses for photoionizable volatile organic compounds (VOCs) indicates that chloroform and methyl ethyl ketone were detected on one occasion in separate samples, at concentrations of 23.0 ug/kg and 10.0 ug/kg, respectively. All other VOCs analyzed for were below the minimum detection limits (MDLs) for the analytical method used. All semi-volatile compounds analyzed for were below MDLs. Estimated values for several semi-volatile compounds that were identified at concentrations below the MDLs are presented in Table 2-1. No TCL pesticides or PCBs were detected.

Cadmium and mercury were the only inorganics detected above background soil levels. The inorganic analyses identified two elements, cadmium and mercury, in all but one of the samples, at maximum concentrations of 2.6 mg/kg and 0.47 mg/kg, respectively. Refer to Table 1 for the occurrence of constituents in the surficial soil samples.

Subsurface Soil

Evaluation of the VOC analyses indicates that three compounds (acetone, methylene chloride, and methyl ethyl ketone) were detected at concentrations above their MDLs in several of the subsurface soil samples. The maximum detected concentrations of acetone and methylene choride were 134 ug/kg and 17.6 ug/kg, respectively; however, acetone and methylene chloride were also detected in the field and trip blanks indicating these compounds are likely laboratory contaminants. In addition, please note that because they are considered to be likely laboratory contaminants, acetone and methylene chloride are not listed as part of Table 2. Methyl ethyl ketone was detected in one subsurface soil sample at an estimated maximum concentration of 23.8 mg/kg. Evaluation of the semi-volatile analyses indicate that no concentrations of compounds were detected above the MDLs. The only detectable pesticide/PCB compound was delta-BHC occurring in one subsurface soil sample at an estimated concentration of 30 ug/kg. The inorganic analyses indicates maximum concentrations of cadmium (1.6 mg/kg), zinc (340 mg/kg), copper (348 mg/kg), and lead (210 mg/kg) which exceed the background subsurface sample concentrations. Refer to Table 2 for the occurrence of constituents in the subsurface soil samples.

Groundwater

The groundwater samples collected from the thirteen on-site monitoring wells did not exhibit any VOCs above the MDLs. The semi-volatile analyses indicated that four compounds were detected above MDLs during the two groundwater sampling rounds. Concentrations above the MDLs of 2,4-dimethylphenol (23 ug/l), napthalene (110 ug/l), and 2-methylnapthalene (6.63 ug/l) were detected in a single groundwater sample during the first round. During the second round of groundwater samples bis-(2-ethylhexyl)phthalate was detected above the MDL in one sample at a concentration of 2.3 mg/l. No TCL pesticides or PCBs were detected. Seventeen inorganic elements were detected in at least two groundwater samples including cadmium and lead at maximum concentrations of 3.2 ug/l and 9.9 ug/l respectively. Groundwater indicator parameters were also analyzed to assist in characterizing

Table 1 Occurrence of Constituents in Surficial Soil at the Old City Landfill, Columbus, Indiana

Constituent	*Range [a]*	*Average Detected Concentration [b]*	*Frequency of Detection [c]*	*Background Range*
Metals				
Aluminum	3,800-7,610	6388	12/12	7,410-16,900
Antimony	3.4-9.6	6.12	6/12	[illegible]
Arsenic	3.2-6.9	4.39	12/12	[illegible]
Barium	20-120	70.3	12/12	[illegible]
Beryllium	0.18-0.55	0.34	12/12	[illegible]
Cadmium	0.13-2.6	0.65	12/12	0.37-0.97
Calcium	31,500-126,000	53058	12/12	4,100-62,900
Chromium	7.9-35	13.03	12/12	12-32
Cobalt	3.3-6.7	4.89	12/12	[illegible]
Copper	7.1-67	18	12/12	[illegible]
Iron	9,590-21,400	14216	12/12	15,200-28,700
Lead	7.4-92	33	12/12	[illegible]
Magnesium	10,700-34,600	18350	12/12	4,050-13,900
Manganese	263-833	468	12/12	540-1,310
Mercury	0.05-0.47	0.10	12/12	0.061-0.096
Nickel	2.1-43	21.1	12/12	11-40
Potassium	540-1,300	933	12/12	1,100-2,400
Silver	0.57-0.76	0.65	4/12	BDL-0.93
Sodium	52-140	83.3	12/12	41-110
Vanadium	11-22	16.4	12/12	21-37
Zinc	28-180	74.1	12/12	58-110
Volatile Organics				
Chloroform	0.023	0.023	1/12	BDL
Dichlorobromo-methane [d]	0.0048	0.0048	1/12	BDL
2-Hexanone [d]	0.0058	0.0058	1/12	BDL
Methyl ethyl ketone [d]	0.01	0.01	1/12	BDL
M-xylene [d]	0.002	0.002	1/12	BDL
Semi-Volatile Organics [d]				
Diethyl phthalate	0.04-0.06	0.05	4/12	0.043-0.063
Di-n-butylphthalate	0.04-0.05	0.05	2/12	0.055
Fluoranthene	0.03-0.49	0.21	6/12	0.056-0.077
Pyrene	0.03-0.39	0.18	6/12	0.069
Chrysene	0.07-0.11	0.09	2/12	BDL
Bis(2-ethylhexyl)phthalate	0.06-0.41	0.17	4/12	0.2-0.3
Di-N-octylphthalate	0.07	0.07	1/12	BDL
Benzo(b)fluoranthene	0.02-0.18	0.11	4/12	BDL
Benzo(a)pyrene	0.09	0.09	1/12	BDL
Indeno(1,2,3-c,d)pyrene	0.08	0.08	1/12	BDL
Benzo(g,h,i)perylene	0.09	0.09	1/12	BDL
Miscellaneous				
Cyanide (total)	0.00061-0.00078	0.00068	3/12	0.00091

Concentrations reported in milligrams per kilogram (mg/kg).

BDL = Below Detection Limit.

[a] = Minimum - Maximum Concentrations.

[b] = Average is based upon those data points reported as above Detection Limit.

[c] = x/y; where x = number of samples with analytical results above the detection limit and y = number of samples analyzed.

[d] = Estimated concentration; all semi-volatile compound concentrations are estimated values.

Table 2 Occurrence of Constituents in Subsurface Soil at the Old City Landfill, Columbus, Indiana

Constituent	Range [a]	Average Detected Concentration [b]	Frequency of Detection [c]	Background Range [d]
Metals				
Aluminum	1,300-3,250	2247	7/7	8,810-12,900
Antimony	2.2-5.3	3.8	7/7	BDL
Arsenic	2.0-5.2	3.1	7/7	5.4-9.9
Barium	8.3-180	47.0	7/7	85-120
Beryllium	0.055-0.28	0.12	7/7	0.29-0.47
Cadmium	0.091-1.6	0.85	2/7	BDL
Calcium	41,200-176,000	97314	7/7	44,200-44,900
Chromium	3.1-49	12	7/7	11-14
Cobalt	1.8-3.6	2.6	6/7	6.4-7.8
Copper	3.4-348	55	7/7	12-17
Iron	5,780-14,900	8388	7/7	16,600-24,400
Lead	1.8-210	33	7/7	12-17
Magnesium	1,920-43,500	24517	7/7	16,000-19,700
Manganese	196-445	290	7/7	570-934
Mercury	0.018-0.24	0.067	5/7	BDL
Nickel	3.6-36	9.7	7/7	13-20
Potassium	120-590	281	7/7	670-800
Silver	0.27-1.9	0.92	4/7	BDL
Sodium	44-93	63.3	7/7	BDL
Vanadium	4.5-16	8.3	7/7	19-26
Zinc	9.8-340	63	7/7	53-74
Cyanide (total)	0.00059-0.00085	0.00069	6/7	BDL
Volatile Organics				
Methyl Ethyl Ketone [e]	0.023	0.023	1/7	BDL
Base/Neutral and Acid Compounds				
Acenaphthene	0.032	0.032	1/7	BDL
Benzo(a)anthracene	0.053	0.053	1/7	BDL
Benzo(a)pyrene	0.36	0.36	1/7	BDL
Benzo(b)fluoranthene	0.45	0.45	1/7	BDL
Benzo(g,h,i)perylene	0.69	0.69	1/7	BDL
Benzo(k)fluoranthene	0.41	0.41	1/7	BDL
Chrysene	0.43	0.43	1/7	BDL
1,4-Dichlorobenzene	0.039	0.039	1/7	BDL
Fluoranthene	0.54	0.54	1/7	BDL
Fluorene	0.021	0.021	1/7	BDL
Indeno(1,2,3-c,d)-pyrene	0.3	0.30	1/7	BDL
Naphthalene	0.022	0.022	1/7	BDL
N-Nitrosodi-N-propyls	0.023	0.023	1/7	BDL
Phenanthrene	0.28	0.28	1/7	BDL
Pyrene	0.44	0.44	1/7	BDL
1,2,4-Trichloro-benzene	0.021	0.021	1/7	BDL
Dibenzofuran	0.012	0.012	1/7	BDL
Diethyl phthalate	0.030	0.030	1/7	0.030
2-Chlorophenol	0.048	0.048	1/7	0.04
Pesticides and PCBs				
Delta-BHC [e]	0.03	0.03	1/7	BDL

Concentrations reported in milligrams per kilogram (mg/kg).
BDL = Below Detection Limit.
[a] = Minimum - Maximum concentrations.
[b] = Average is based upon those data points reported as above Detection Limit.
[c] = x/y; where x = number of samples with analytical results above Detection Limit and y = number of samples analyzed.
[d] = Average range of two samples (GMSB14-03 and GMSB14-08) collected from depths of 4-6 and 14-16 feet.
[e] = Estimated concentration.

Table 3 Occurrence of Constituents in Ground Water at the Old City Landfill, Columbus, Indiana

Constituent	Range [a]	Average Detected Concentration [b]	Background Range	MCLs [c]	
Metals					
Aluminum	0.02[d]-0.16	0.030	0.073-1.32	0.05-0.2	[PS]
Arsenic	0.0004[d]-0.016	0.0026	0.0009	-	
Barium	0.078-0.58	0.21	0.10	5.00	
Beryllium	0.00020[d]-0.0004	0.00023	BDL	0.001	[P]
Cadmium	0.00075[d]-0.0032	0.0011	BDL	0.005	
Calcium	86.4-165	120	109-112	-	
Chromium	0.0029[d]-0.0058	0.0031	BDL	1.0	
Copper	0.0018[d]-0.012	0.003	BDL	1.3	
Lead	0.0006[d]-0.0099	0.002	0.0037-0.0083	0.005	
Magnesium	21-49	3.3	27.4-27.9	-	
Manganese	0.00075[d]-0.89	0.31	0.258-0.944	0.05	[S]
Nickel	0.0019[d]-0.0063	0.0028	BDL	1.0	
Potassium	0.65-34.6	9	1.7-1.9	-	
Selenium	0.00035[d]-0.0018	0.0049	BDL	0.05	
Silver	-	-	BDL	0.09	[PS]
Sodium	2.1-3.5	19	8.2-12	-	
Thallium	-	-	BDL	0.002	[P]
Vanadium	0.0027[d]-0.001	0.0039	BDL	-	
Zinc	0.0015[d]-0.31	0.076	0.0054-0.068	5.0	[S]
Organic Compounds					
Bis(2-ethylhexyl) phthalate [e]	0.0020-2.3	0.0061	BDL	-	
Acenapthylene	-	-	BDL	-	
2,4-dimethylphenol	-	-	BDL	-	
1,2-dichloroethane	-	-	BDL	0.005	
Methyl ethyl ketone	-	-	BDL	-	
2-methylnapthalene	-	-	BDL	-	
Napthalene	-	-	BDL	-	
Toluene	-	-	BDL	2.0	
Miscellaneous					
Chloride	21-56	33	24.6-31.8	250	[S]
Nitrate	0.05[d]-10.8	2.4	7.6	10.0	
Sulfate	26-60	41	43-67	250	[S]

Concentrations reported in milligrams per liter (mg/L).
BDL = Below Instrument Detection Limit.
"-" Indicates constituent detected only once or MCL not currently established.
[a] = Minimum-Maximum concentrations.
[b] = Average utilizes 50% of method Detection Limit for data points reported below quantitation limit.
[c] = Maximum contaminant levels for drinking water (USEPA April 1990)
[d] = Value is one-half of instrument Detection Limit.
[e] = Average was calculated geometrically due to an extreme outlier concentration.
[S] = Secondary Maximum Contaminant Level
[P] = Proposed Maximum Contaminant Level
[PS] = Proposed Secondary Maximum Contaminant Level

groundwater conditions at the site. Because no distinct plume of TCL constituents has been identified as emanating from the landfill area, groundwater indicator parameters were monitored to assist with the assessment of groundwater transport from the site. The groundwater indicator parameters measured included; chloride, nitrate, and sulfate. Refer to Table 3 for the occurrence of these constituents in the groundwater samples.

Surface Water

Evaluation of the VOC analyses indicates that methylene chloride and acetone were detected, although these compounds were also detected in the field and trip blank samples. Bis(2-ethylhexyl) phthalate was detected at a maximum concentration of 1.8 ug/l; however, it was also detected upstream of the landfill at a concentration of 1.2 ug/l. There were no semi-volatile compounds detected above the MDLs in the three surface water samples and in the duplicate and field blank samples. No TCL pesticides or PCBs were detected.

The inorganic analyses results identified 10 elements with concentrations above the MDL. Of these, only lead, which was detected in only one sample at 1.1 ug/l, has a federal standard for ambient water quality, which is 3.2 ug/l. Refer to Table 4 for the occurrence of constituents in the surface water samples. Acetone and methylene chloride are not listed on Table 4 because they are likely laboratory contaminants.

River Sediment

There were no concentrations of VOCs or semi-volatiles detected above the MDLs in the river sediment samples. However, estimated concentrations (below MDLs) of bis(2-ethylhexyl) phthalate (maximum concentration of 0.68 mg/kg) and 2,4,6-trichlorophenol (0.12 mg/kg) were detected. In addition, no TCL pesticides or PCBs were detected and the inorganic analytical results indicated that the detected element concentrations were not excessive relative to the background levels. Refer to Table 5 for the occurrence of constituents in the river sediment samples.

Landfill Waste Material

The VOC constituents detected in the waste material samples include benzene, ethylbenzene, metyhlene chloride, toluene, acetone, carbon disulfide, methyl ethyl ketone, methyl isobutyl ketone, and xylene. Semi-volatile constituents (flouranthene 4.9 mg/kg, phenanthrene 6.7 mg/kg, pyrene 3.6 mg/kg, napthalene 8.2 mg/kg, and 2-methylnapthalene 2.3 mg/kg) were detected above the MDL in three of

Table 4 Occurrence of Constituents in Surface Water from the East Fork of the White River, Columbus, Indiana

Constituent	Range [a]	Average Detected Concentration [b]	Frequency of Detection [c]	Site-Specific Background [d]
Metals				
Aluminum	0.057-0.058	0.058	2/2	0.047
Barium	0.074-0.081	0.078	2/2	0.074
Calcium	84.2-86.2	85.2	2/2	85.5
Copper	0.0052-0.0056	0.0054	2/2	0.0039
Iron	0.16-0.17	0.17	2/2	0.13
Magnesium	28.9-29.5	29.2	2/2	29.5
Manganese	0.020-0.035	0.028	2/2	0.02
Potassium	1.9-2.0	2.0	2/2	1.8
Sodium	26.0-29.0	27.5	2/2	27.0
Zinc	0.0072-0.0075	0.0074	2/2	0.012
Organics				
Bis(2-ethylhexyl) phthalate	0.00087-0.0018	0.0016	2/2	0.0012

Concentrations reported in milligrams per liter (mg/L).

[a] = Minimum-Maximum concentrations.

[b] = Average is based upon those data points reported as above detection limit.

[c] = x/y; where x = number of samples with analytical results above the detection limit and y = number of samples analyzed.

[d] = From upstream sample (I.D. GMSS01).

Table 5. Occurrence of Constituents in Sediment from the East Fork of the White River, Columbus, Indiana.

Constituent	Range [a]	Average Detected Concentration [b]	Frequency of Detection [c]	Site-Specific Background [d]
Metals				
Aluminum	1,500-1,600	1550	2/2	1600
Antimony	3.5-4.7	4.1	2/2	BDL
Arsenic	1.8	1.8	2/2	1.8
Barium	13-16	14.5	2/2	13
Beryllium	0.19	0.19	1/2	0.19
Cadmium	0.16	0.16	1/2	0.11
Calcium	108,000-128,000	18000	2/2	64700
Chromium	4.2-5.2	4.7	2/2	5.8
Cobalt	1.4	1.4	2/2	BDL
Copper	3.7-4.4	4.1	2/2	2.6
Iron	5,150-6,110	5630	2/2	4400
Lead	2.3-10	6.2	2/2	2.6
Magnesium	36,800-37,500	37150	2/2	18300
Manganese	216-324	270	2/2	152
Mercury	BDL	BDL	0/2	0.042
Nickel	4.2-4.4	4.3	2/2	4.9
Potassium	210-250	230	2/2	290
Silver	0.81	0.81	1/2	BDL
Sodium	76-130	103	2/2	110
Vanadium	7.2-8.8	8	2/2	5.6
Zinc	14-16	15	2/2	18
Base/Neutral and Acid Compounds				
Bis(2-ethylhexyl) phthalate [e]	0.11-0.68	0.39	2/2	BDL
2,4,6-Trichloro-phenol [e]	0.12	0.12	1/2	BDL
Miscellaneous				
Cyanide (total)	0.0008	0.0008	1/2	BDL

Concentrations reported in milligrams per kilogram (mg/kg).

BDL = Below Detection Limit.

[a] = Minimum-Maximum concentrations.

[b] = Average is based upon those data points reported as above Detection Limit.

[c] = x/y; where x = number of samples with analytical results above the detection limit and y = number of samples analyzed.

[d] = From upstream sample (I.D. GMSD01).

[e] = Estimated concentration(s).

Table 6. Occurrence of Constituents in Landfill Samples at the Old City Landfill, Columbus, Indiana.

Constituent	*Range (a)*	*Average Detected Concentration (b)*	*Frequency of Detection (c)*
Metals			
Aluminum	1,300-8,390	4788	8/8
Antimony	3.20-23.0	11	4/8
Arsenic	1.90-9.40	5.01	8/8
Barium	19.0-1,580	288.0	8/8
Beryllium	0.06-0.52	0.23	8/8
Cadmium	0.14-24.0	6.94	6/8
Calcium	48,800-164,000	102675	8/8
Chromium	4.70-3,250	431	8/8
Cobalt	1.20-49.0	9.53	7/8
Copper	5.30-220	86.7	8/8
Iron	5,240-61,000	31630	8/8
Lead	1.80-7,610	1216	8/8
Magnesium	9,620-38,000	22388	8/8
Manganese	320-1,510	605	8/8
Mercury	0.03-0.36	0.17	7/8
Nickel	4.4-95	39.2	8/8
Potassium	210-1,500	885	8/8
Silver	0.67-29.0	12.52	4/8
Sodium	81.0-380	202	8/8
Vanadium	5.7-19.0	13.14	8/8
Zinc	14.0-3370	912	8/8
Cyanide (total)	0.00064-0.0018	0.0009	8/8
Volatile Organics			
Ethylbenzene	0.003-0.02	0.01	2/8
Toluene	0.001-0.0014	0.0012	1/8
Methyl ethyl ketone	0.01-0.03	0.02	2/8
Methyl-iso-butyl ketone	0.07	0.07	1/8
M-xylene	0.0061-0.05	0.03	2/8
O+P-xylenes	0.0069-0.06	0.04	2/8

see notes next page

Table 6. Occurrence of Constituents in Landfill Samples at the Old City Landfill Columbus, Indiana (continued).

Constituent	Range [a]	Average Detected Concentration [b]	Frequency of Detection [c]
Base/Neutral and Acid Compounds			
Acenaphthene	0.11-2.52	1.22	4/8
Anthracene	1.79	1.79	1/8
Benzo(a)anthracene	0.13-1.75	0.69	3/8
Benzo(a)pyrene	0.58	0.58	1/8
Benzo(b)fluoranthene	0.14-0.46	0.3	2/8
Benzo(g,h,i)perylene	0.08-0.92	0.5	2/8
Benzo(k)fluoranthene	0.45	0.45	1/8
Chrysene	0.10-1.24	0.65	3/8
Dibenzo(a,h)anthracene	0.19	0.19	1/8
Di-N-butyl phthalate	7.63	7.63	1/8
Fluoranthene	0.19-4.89	2.39	5/8
Fluorene	0.13-2.10	0.86	5/8
Indeno(1,2,3-c,d)-pyrene	0.35	0.35	1/8
Naphthalene	0.08-8.15	3.12	5/8
Phenanthrene	0.62-6.7	3.03	5/8
Pyrene	0.22-3.56	1.71	5/8
2-Methylnaphthalene	0.07-2.33	1.19	5/8
Dibenzofuran	0.07-1.62	0.65	5/8
Pesticides and PCBs			
Beta-BHC	0.29	0.29	1/8
Delta-BHC	0.02	0.02	1/8
4,4'-DDD [e]	0.05-0.06	0.06	2/8
Heptachlor	0.013	0.013	1/8
Alpha-Chlordane	0.09	0.09	1/8
Gamma-Chlordane	0.09	0.09	1/8
Aroclor 1254 [e]	0.84	0.84	1/8

Concentrations reported in milligrams per kilogram (mg/kg).

[a] = Minimum - Maximum Concentrations.

[b] = Average is based upon those data points reported as above Detection Limit.

[c] = x/y; where x = number of samples with analytical results above the detection limit and y = number of samples analyzed.

[d] = Average of two samples (GMSB14-03 and GMSB14-08) collected from depths of 4-6 and 14-16 feet.

[e] = Estimated concentrations.

the eight waste samples. Pesticides and PCBs detected include: 4,4'-DDD (estimated concentration 57 ug/kg), alpha- chlordane (maximum concentration of 93 ug/kg); and Aroclor 1254 (estimated concentration of 0.84 mg/kg). The inorganic analyses indicated the presence of a majority of the TCL elements at moderate concentrations including: cadmium (24 ug/kg); nickel (95 mg/kg); mercury (0.36 mg/kg); and lead (estimated at 21,700 mg/kg). Refer to Table 6 for the occurrence of constituents in the landfill samples.

General

* The landfill is currently fully covered with dredged sediment from the river consisting primarily of silty sand and clay.

* The landfill cover material is generally 2 to 3 feet in thickness across the landfill, however, 4 to 5 feet of cover material has been documented in at least two locations.

* The landfill currently supports a full vegetative cover, ranging from grasses to trees. No evidence of stressed vegetation was observed.

* The landfill has been subjected to annual flooding, primarily during the springtime, which most likely has caused the waste material to become submerged in the flood waters.

* No evidence of leachate seeps/cracks have been observed.

Summary of Site Risks

The RI Report contains a Risk Assessment (RA) which characterizes the nature and magnitude of potential risks to human health and the environment caused by the contaminants identified at the OCL. The RA, utilizing data obtained from the RI, addressed the following issues:

* The potential for exposure to constituents found at the site;

* The inherent toxicologic hazards associated with the constituents at the site; and

* The risks posed by potential exposure to constituents at the site.

A. Selection of Indicator Chemicals

The following constituents, judged representative of site contamination and posing the greatest potential health risk, are considered constituents of concern:

* Cadmium
* Lead
* Polycyclic aromatic hydrocarbons (PAHs)
* Phthalate esters
* Methyl ethyl ketone
* cyanide

B. Exposure Characterization

The purpose of the exposure characterization is to estimate the type and magnitude of exposure to constituents of concern that are present at, or migrating from, a site. There are no identified exposed populations or wells impacted by contaminants released from the OCL. The results of the RI concluded that the environmental media of potential concern at the site (i.e., air, surficial soil, groundwater and surface water) have not been adversely affected by contaminants from the the OCL. As a result, the only current potential exposure pathway is the ingestion of, and direct contact with, the landfill soil cover and waste material. Potential future exposure pathways include: (1) direct contact and incidental ingestion of surficial soils on-site by hikers or construction workers; (2) swimming or ingestion of fish caught locally in the East Fork of the White River or the quarry; and (3) ingestion of water from a hypothetical potable well installed downgradient of the site.

C. Toxicity Assessment Summary

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The U.S. EPA has also derived cancer classifications for constituents of concern. These classifications are as follows:

A = Human Carcinogen.
B1 = Probable human carcinogen; limited human data available.
B2 = Probable human carcinogen; animal data only.
C = Possible human carcinogen.
D = Not classifiable as to human carcinogenicity.
E = Evidence of noncarcinogenicity for humans.

Table 7 provides RfDs, CPFs, and carcinogenicity classifications for the constituents of concern at the site.

D. Risk Characterization

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. An excess lifetime cancer risk of greater than 10^{-4} is generally considered unacceptable. Excess lifetime cancer risks in the range of 10^{-4} to 10^{-6} are potentially acceptable.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The

Table 7 Reference Doses (RfDs), Cancer Potency Factors (CPF), and USEPA Cancer Classification for Constituents Detected at the Old City Landfill, Columbus, Indiana.

	RfD [a]		CPF [a]		USEPA
Constituent	Oral mg/kg/day	Inhalation mg/kg/day	Oral (mg/kg/day)-1	Inhalation (mg/kg/day)-1	Cancer Classification
Metals					
Cadmium	5.00E-04	5.00E-04	NA	6.10E+00	B1
Lead	1.4E-3 [b]	4.3E-4 [b]	NA	NA	B2
PAHs					
Benzo(a)pyrene	4.0E-3[c]	4.0E-03	1.15E+1[d]	6.10E+0[d]	B2
Naphthalene	4.03E-3[e]	4.0E-03	NA	NA	D
Phthalates					
Bis(2-ethylhexyl) phthalate	2.0E-02	2.0E-02	1.4E-02	1.4E-02	B2
Volatile Organic					
Methyl ethyl ketone	5.0E-02	5.0E-02	NA	NA	D
Miscellaneous					
Cyanide(as HCN)	2.0E-02	2.0E-02	NA	NA	D

Notes:

a = Source of RfD and CPF was IRIS (1990) unless otherwise noted. When data for inhalation were not available, the oral data were used (number in parenthesis).

b = From USEPA, 1986d.

c = No RFD available for benzo(a)pyrene. The RFD for napthalene is used as a surrogate value.

d = From USEPA, 1986e.

e = From USEPA, 1989c.

NA = Not available.

HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The risks associated with each of the potential pathways using the contaminants of concern for the OCL are as follows:

Drinking Water

The HI and excess lifetime cancer risk for hypothetical future exposure to groundwater as a source of drinking water were calculated. The HI for the individual constituents and the cumulative total HI for all the constituents (0.97) is below the regulatory concern level of 1.0. The excess lifetime cancer risk level for hypothetical future use of groundwater as a source of drinking water is 9.8×10^{-7} or 9.8E-07.

Soils

1. Hiker/Trespasser

The HI and excess lifetime cancer risks for current hiker/trespasser soil exposure were calculated. The cumulative total HI for all the constituents (0.014) is well within acceptable guidelines. The excess lifetime cancer risk for current exposure to soils by a hiker/trespasser is 9.5×10^{-7}.

2. Construction Worker

Future exposure of a construction worker to the surficial soils while working on the proposed roadway construction project were calculated. Hypothetical future risks for a construction worker exposed to soils are within acceptable guidelines. Estimates of the cumulative total HI and excess lifetime cancer risk are 0.053 and 8.7×10^{-8}, respectively.

3. Resident

The HI and excess lifetime cancer risk for hypothetical future soil exposure by an adult and child living on the site were calculated. For adult residential exposure, the HI for the individual constituents and the cumulative total HI for all the constituents (0.49) is below the regulatory concern level of 1.0. The excess lifetime cancer risk for hypothetical future soil contact by an adult resident is 3.3×10^{-6}. For a child exposed to surficial soils from ages 6 months to 3-1/2 years (when soil ingestion is highest), the cumulative total HI for all constituents is 0.57. The excess lifetime cancer risk level for hypothetical future child exposure to soils is 3.4×10^{-6}.

Swimming

The HI and excess lifetime cancer risk for people swimming in the East Fork of the White River adjacent to the site were calculated. The HI and excess lifetime cancer risk are 0.0012 and 1.2×10^{-9}, respectively.

Fish Ingestion

The HI and excess lifetime cancer risks for hypothetical future fish ingestion were calculated. The cumulative total HI for all the constituents is 0.057. The excess lifetime cancer risk level is 3.6×10^{-7}.

Environmental Risks

The environmental risks posed by the constituents of concern were judged to be minimal. All constituents detected in surface water were below background concentrations, FWQC, or laboratory-tested LC_{50} results. Constituents found in sediments did not vary significantly from typical background levels and therefore are not considered to currently pose a hazard to aquatic life. Concentrations of constituents in surficial soils are within local background concentrations and are not deemed to contribute excess risk to the terrestrial ecosystem.

In each scenario, conservative assumptions were made, based on current observed conditions at the site. The analytical methods used in making the risk calculations are described within the Risk Assessment portion of the Remedial Investigation Report.

E. Uncertainties

The Risk Assessment calculations were based on current observed conditions at the site. Preliminary data, presented in the Technical Supplement to the FS, indicate that placement of the proposed roadway will not adversely impact the site. This determination, however, is not conclusive as the future impact of roadway construction is impossible to predict. The groundwater beneath the site is especially vulnerable to increased leachate generation from the compaction of the waste material. Therefore, protective measures are required to monitor site conditions during and after construction of the roadway. In addition, the integrity of the current landfill cover must be maintained against disruption by heavy equipment and road construction activity. Finally, because construction of the roadway will increase site access, fencing is necessary to deter unauthorized entry and reduce impact on the landfill cover.

POTENTIAL ROADWAY PLACEMENT

In the event the Indiana Department of Transportation and the City of Columbus proceed with construction of the proposed roadway across the OCL, the U.S. EPA shall require implementation of Alternative 2A - "Institutional Controls with Roadway Placement" from the FS. The measures outlined as components of Alternative 2A are necessary to ensure the continued protection to human health and the environment if the road is built on the site. The components of Alternative 2A are as follows:

* Installation of a fence with appropriate warning signs around the site. The fence shall be a minimum of six feet in height, with three strands of barbed wire across the top. The type of fence shall be chain link, with a minimum of two swing gates. Locks shall be provided to secure the site.

* Implementation of a landfill cover maintenance program as outlined in the FS, including provisions for periodic leachate inspections.

* Development of a Groundwater Recovery System Implementation Plan (including analytical modeling and preliminary design).

* Installation of additional groundwater monitoring wells to augment the existing well network. A minimum of two (2) additional wells are needed downgradient of the landfill in order to monitor flow towards the quarry.

* Implementation of a groundwater monitoring program, allowing for sampling at appropriate intervals, with more frequent sampling events during and after roadway construction.

* Institutional controls will be sought to reduce exposure to site contaminants by legally restricting access to the site. Deed restrictions on land and water use on the landfill would be sought from the landfill owner. The U.S. EPA would request the local municipality to enact a zoning ordinance that would forbid future use of the site and restrict drilling of groundwater wells.

  In the event that institutional controls are not voluntarily obtained, the remedial action may be re-evaluated to determine if additional actions should be implemented to ensure that the remedy is permanent and effective on a long term basis.

VI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Selected Remedy has not changed from the recommended remedy that was presented within the Proposed plan and which was available for public review and comment from January 23, 1992 through February 21, 1992.

VII. SUMMARY

The OCL, in its present condition, falls within acceptable health-based and environmental quality-based guidelines. Thus, the selected remedy for this site is "no action" (modified). However, the Feasibility Study and Technical Supplement indicate that road construction activities could adversely impact site conditions. Specifically, the potential exists for enhanced leachate generation from the landfill, due to compression of waste material and soils underlying the proposed roadway. Increased leachate generation could further degrade the groundwater at the site and potentially impact the East Fork of the White River. Therefore, in order to ensure protection of human health and the environment in the future, the U.S. EPA shall require implementation of Alternative 2A, described above, before construction of a roadway is permitted across the site.

OLD CITY LANDFILL
COLUMBUS, INDIANA
RESPONSIVENESS SUMMARY

I. RESPONSIVENESS SUMMARY OVERVIEW

In accordance with CERCLA Section 117, a public comment period was held from January 23 - February 21, 1992, to allow interested parties to comment on the United States Environmental Protection Agency's (EPA's) Feasibility Study (FS) and Proposed Plan for a final remedy at the Old City Landfill Superfund site. At a January 30, 1992, public meeting, EPA and Indiana Department of Environmental Management (IDEM) officials presented the Proposed Plan for the Old City Landfill site, answered questions and accepted comments from the public. Written comments were also received through the mail.

II. BACKGROUND OF COMMUNITY CONCERN

Community interviews were conducted in Columbus prior to the onset of the Remedial Investigation. These interviews took place in November and December 1987 with local officials and residents. Concern about the landfill was minimal, many residents being unaware that the landfill was a Superfund site. (The lack of concern about Old City Landfill did not indicate no concern about hazardous waste issues overall, however, as there is another Superfund site in Columbus (Tri-State Plating) that generated concern among residents.)

EPA's Community Relations Plan, dated May 1988, outlined a series of activities to encourage public participation and keep local citizens informed of activities at the site. A public information repository was developed at the Bartholomew County Public Library, a kick-off meeting was held April 20, 1988, to introduce the Remedial Investigation and Feasibility study phase of work at the site, and fact sheets were developed and mailed (dated April 1988, Fall 1988, Spring 1989, March 1991, and January 1992). The March 1991 fact sheet provided a form for citizens to send in if they were interested in attending a meeting about the site. Only one person indicated any interest; a meeting was not held. EPA news releases were issued September 28, 1987; April 15, 1988; August 17, 1990; and January 22, 1992.

Of interest to the public, and related to the clean-up decision, is the proposal by the City and State to build a new entrance to the City (State Highway 46), including a new bridge and a road over the landfill. As a result of this proposal, the feasibility study was conducted to include the possibility of a road on the landfill. Remedial alternatives were developed, each considering a no-road possibility and a road possibility (designated the "A" option of each alternative). EPA emphasized that the road is not a part of the remedial alternative, but had to be considered in deciding what should be done at the site.

A public meeting to share EPA's proposed plan for remedial action was held January 30, 1992. About 40 people attended, but few questions were asked or comments made; four comments were received in the mail. Since the site poses a low enough level of risk that requires a No Action decision (if proposed State highway 46 is not built) and minimal action if the road is built, EPA officials must assume the subdued public interest is a result of the low risk levels.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES

The comments are organized into the following categories:

A. Summary of comments from the local community

B. Summary of comments from Potentially Responsible Parties (PRPs)

The comments from the local community are paraphrased in order to effectively summarize them in this document. Since Cummins Engine Company was the only PRP to comment on the proposed plan, EPA has extracted their points verbatim in this Responsiveness Summary. The reader is referred to the public meeting transcript which is available in the public information repository, located at the Bartholomew Public Library, 536 Fifth St., Columbus. Written comments received at EPA's regional office are on file in the Region 5 office. The site community relations coordinator should be contacted for access to these comments. (Contact: Karen Martin, (312)886-6128, or (800)621-8431 (9-4:30 CST))

A. SUMMARY OF COMMENTS FROM THE LOCAL COMMUNITY

1. One audience member from the public meeting expressed the opinion that if hazardous waste exists at the site, it should be cleaned up. One written comment seems to agree with this.

EPA Response: The results of the Remedial Investigation show that no discrete areas of contamination were discovered at the site. In addition, no records were kept at the landfill that would indicate the presence or location of drummed wastes at the site. Furthermore, the risk assessment concluded that the highest excess cancer risk at the site was 3.4×10^{-6}. This risk is significantly lower that EPA's action level of 10^{-4}.

2. Two other written comments were received; one indicated no specific solution; the other supported the No Action alternative.

EPA Response: No response called for.

B. SUMMARY OF COMMENTS FROM POTENTIALLY RESPONSIBLE PARTIES

1. Several written comments were received from Cummins Engine Co., on behalf of the Respondent PRPs (Cummins Engine Co., Arvin Industries, and the City of Columbus) expressing the opinion that a no action alternative is appropriate at the site with or without the bridge. These comments are as follows:

<u>PRP COMMENT 1.1:</u> "The agencies' justification for the choice of alternatives is their professed concern that the weight of the road may possibly squeeze out contaminants from the landfill into the groundwater. This concern is flawed. There have been seven years of samples taken at the site, from the original EPA notification through the Remedial Investigation up to the present day. None of the samplings have indicated any level of contaminants - in the soil, groundwater or surface water - that are above levels of concern. In addition, a risk analysis was undertaken in connection with the Remedial

Investigation. This analysis proved that even the most direct exposure to the site was well within the risk levels considered safe by the EPA."

EPA RESPONSE: Section 5.5.2 of the Final Feasibility Study Report, prepared on behalf of the PRPs by Geraghty & Miller, concluded that there would be a greater chance for contaminant releases to occur due to placement of the roadway. The FS specifically states: "by loading and compacting the waste material, there would be a greater potential for the generation of leachate. This leachate could lead to seep formation at the toe of the landfill and/or cause releases of contaminants into the underlying groundwater. Without any inspection and monitoring controls which could trigger appropriate remedial action, Alternative 1A (Roadway Placement With No Action) would not ensure the overall protection of human health and the environment."

The U.S. EPA did not accept sample results for quantitative use prior to the commencement of the Remedial Investigation due to the fact that quality assurance/quality control procedures used during the sampling and analysis activities had not been approved by the Agency or sufficiently documented. Therefore, the statement that there has been seven years of sampling is true, but only a portion of that data has been deemed acceptable.

The Agency agrees with the statement that the RI says that none of the samplings indicated any levels of contaminants above levels of concern. However, this is based on current conditions at the site. As stated above, the FS said that these conditions could change with placement of the roadway and further contamination could occur. The U.S. EPA is in agreement with this conclusion and feels that it demonstrates the need for protective measures if the roadway is constructed.

The conclusions presented in the Risk Assessment are also based on current conditions at the site. Again, if the road is built across the landfill, these conditions may change and risks may become unacceptable due to further contamination.

If the proposed roadway is to be constructed, it is essential to provide for the continued protection to human health and the environment. The FS demonstrates that the protective measures outlined in the contingent remedy (Alternative 2A) are necessary and justified.

PRP COMMENT 1.2: "Moreover, even if it were conceded that there is potential, after seven years of intensive sampling, for unacceptable levels of toxic substances to have escaped notice, proposed Alternative 2A is excessive for the site based on the results of the work performed to fulfill the requirements of the Technical Supplement to the Feasibility Study. To evaluate the possibility that the road would squeeze out contaminants, the same concern expressed in the proposed plan, the agencies required that two pyramids of soil be constructed - one of them to the height of the proposed bridge. Subsequent sampling showed that levels of contaminants were well below thresholds for action or even concern. As a result, there is no scientific reason that the EPA and IDEM should require a different level of remedial alternative if a road is built than if the site remains undeveloped The respondent PRPs therefore request that the agencies amend the proposed plan to recommend the no action alternative for both possible scenarios."

<u>EPA RESPONSE:</u> As stated above, the U.S. EPA could not accept any ground-water monitoring data prior to the first round of samples collected as part of the Remedial Investigation. This first round of samples was not collected until December, 1988. Therefore, to date, only 38 months of sampling have taken place, not seven years.

Page 23 of The Technical Supplement to the Feasibility Study states "... there is still the possibility that leachate releases could occur sometime in the future."

The statement that "the Agencies required that two pyramids of soil be constructed..." is incorrect. The test fill placement was proposed by the PRPs on behalf of the Indiana Department of Transportation. The main purpose of these fills was to gather settlement data. This settlement data was to be used for the engineering design of the roadway. The Agencies required that ground-water monitoring wells be installed around the test fills, and that these wells be sampled in order to ensure that this test fill placement did not trigger a release of contaminants to the ground water.

The weight of the test fills did not accurately simulate the total weight to be placed on the landfill by the completed roadway. In fact, these test fills only represent a fraction of the total weight of the entire length of road proposed to traverse the fill area. Additional compression to the waste material from vehicles using the road is also anticipated. While it is encouraging to note that the placement of these test fills has not, to date, caused a measurable release of contaminants, it can not be concluded that when the actual road is constructed, and when vehicles begin using the road, a release will not occur. Therefore, the additional protection outlined in Alternative 2A is necessary to ensure continued protection to human health and the environment if the road is built.

<u>PRP COMMENT 1.3</u>: "Should the agencies conclude, however, that institutional controls are necessary if the State of Indiana builds a road and bridge over the property, some difficulties remain with that remedial alternative as proposed. First, there is the requirement that a fence be constructed around the site. As sampling and the risk analysis have demonstrated, trespassers on the site will be in no danger from any constituents present. Therefore, a fence is superfluous and an unnecessary expense."

<u>EPA RESPONSE:</u> Construction of a fence is necessary to ensure the continued integrity of the current cover material. If the cover material is damaged, and waste becomes exposed, a trespasser may come into contact with waste material. If the road is built, and a release occurs because of road construction activities, the conclusions of the risk assessment that state that there is no danger to human health and the environment may no longer hold true. The risk assessment is based on current conditions at the site. If the road is built and a release occurs, obviously those conditions will change. Construction of the fence is necessary to help ensure the integrity of the

current cover material, and thus help to ensure continued protection to human health and the environment.

<u>PRP COMMENT 1.4:</u> "Second, the proposed institutional controls alternative requires additional monitoring wells and a plan to pump and treat any contaminated groundwater that might result from contaminants being squeezed out by the weight of the road. It is the respondent PRP's contention that both the additional monitoring wells and the plan were encompassed within the Technical Supplement work and to do the work again would be redundant."

<u>EPA RESPONSE:</u> The additional wells needed to effectively monitor ground-water flow towards the quarry need to be placed at the southernmost edge of the fill material, in the vicinity of the concrete plant. The purpose of these additional wells is to monitor ground-water quality downgradient of the roadway, but at the edge of the fill material, which is the point of compliance. No wells currently exist at this location. These additional wells are needed to monitor this point, regardless of whether or not the roadway is built. Installation of these wells is a component of both the recommended and contingent remedies.

The plan outlined in the "Environmental Monitoring and Contingency Plan" needs to be further developed and clarified. Section 5.6.1 of the FS states, "Although the procedures in the Plan only apply to the ground-water monitoring required as part of the landfill loading testing program, they could be modified to represent long-term ground-water monitoring procedures."

Based on the above two points, these two tasks are not considered to be redundant. These two tasks must be completed to ensure continued protection to human health and the environment.

<u>PRP COMMENT 1.5:</u> "Finally, we are unclear as to the extent and magnitude of the groundwater sampling program necessary under Alternative 2A"

<u>EPA RESPONSE:</u> Ground-water monitoring would continue on a monthly basis during roadway construction activities, and continue on a monthly basis for a minimum of 90 days after construction is complete. At that time, a determination will be made by the Agencies as to the appropriate frequency of future sampling. If no release is detected, it is envisioned that sampling would then be conducted on a quarterly basis.

RA/RF LTR ONL

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEME

We make Indiana a cleaner, healthier place to live

Evan Bayh
Governor

Kathy Prosser
Commissioner

105 South Meridian Street
P.O. Box 6015
Indianapolis, Indiana 46206-6015
Telephone 317-232-8603
Environmental Helpline 1-800-45

March 20, 1992

Mr. Valdas V. Adamkus
Regional Administrator
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, IL 60604

Dear Mr. Adamkus:

Re: Letter of Concurrence for the Draft Record of Decision for Old City Landfill

The Indiana Department of Environmental Management (IDEM) has reviewed the U.S. Environmental Protection Agency's Proposed Plan. IDEM is in full concurrence with the selected remedial alternative of No Action (with modifications) as long as current site conditions on the Old City Landfill do not change.

The major components of the remedy include:

- Continued ground water monitoring for a minimum of five years.

- Installation of a minimum of two additional wells to augment the current monitoring network.

The Remedial Investigation/Feasibility Reports indicate that there are no contaminants on-site above EPA's health based levels. The Record of Decision is based on sampling results and the risk assessment. The Remedial Investigation/Feasibility Study indicates that the selected alternative adequately addresses the public health, welfare and environment.

The installation of wells and the ground water monitoring procedures must comply with State and Federal rules and regulations.

Mr. Valdas V. Adamkus
Page Two

IDEM also concurs with EPA's contingent alternative of Institutional Controls. It will be implemented if the City of Columbus and INDOT decide to build the proposed State Road 46 over the landfill.

All components of the contingent remedy will be required to meet the respective Applicable or Relevant & Appropriate Requirements.

The major components of the contingent remedy are:

- Install a fence with warning signs.

- Landfill cover maintenance program.

- Development of a ground water recovery system implementation plan.

- Installation of a minimum of two additional ground water monitoring wells.

- Ground water monitoring program.

- Deed restrictions.

Please be assured that IDEM is committed to accomplishing cleanup of all Indiana sites on the National Priorities List and intend to fulfill all obligations required by law to achieve that goal.

Sincerely,

Thomas W. Rarick for

Kathy Prosser
Commissioner

cc: Gary Schafer, U.S. EPA

APPENDIX C

LOCAL CONTRACTOR QUOTE

MILO BROS. INC.

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NOVEMBER 25, 1992

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ATTN: INGEBORG SCHNEIDER

MARK and MAX
219-772-4214

R.R. 5 BOX 77
KNOX, IN 46534

AACOA
ARCHITECTURAL ANODIZING CORPORATION OF AMERICA

November 25, 1992

Mr. David Novak
Community Relations Coordinator
Office of Public Affairs
PS19J
U.S. EPA Region 5
77 West Jackson Blvd
Chicago, IL 60604

Dear Mr. Novak:

We have reviewed the comments made by Miles, Inc. on the EPA's Proposed Plan at The Himco Superfund Site.

The information provided by Miles demands that the proposed action be re-evaluated. Since AACOA is one of the PRPs, we agree with Miles that other than monitoring the site no other action need be taken at this time.

Very truly yours,

Jerry Formsma

Jerry Formsma
President

JF/be